NP-4080

SERVICE MANUAL
(for 220/240V)

REVISION 1 JAN.1993

Canon
FY8-13BT-010

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I. FEATURES

1. The copier's CCD enables automatic reproduction of red/black copies.
   1 The CCD identifies red in documents, enabling automatic reproduction of red/black copies.
   2 Areas of red may be singled out or erased.
2. Circling any areas of a document with a red felt-tipped marker enables the following (digital processing):
   - Framing
   - Blanking
   - Color conversion
   - Highlighting
   - Nega/Posi reversal
3. The copier's semiconductor laser unit enables various digital/analog processing.
   The copier is an analog copier equipped with a compact semiconductor laser unit for digital processing.
   1 Text may be added to the document; the text may be year/month/day notation, time notation, sequence of numbers, memo, stamp, or words.
   2 The document may be edited with high precision (1mm pitch); input of as many as eight areas, framing, blanking, and printing in two colors.
   3 With the screen mode, shading may be added over parts of the document.
   4 With the copy control reporting feature, as may as 25 groups may be stored using unique IDs, and the data may be printed for control of copy volume.
   5 The highlighting feature enables coloring the background of the document.
4. Paper is loaded from the front, and as many as four cassettes may be set.
   The copier is a front-loading type accepting paper from cassettes (up to four, each holding 500 sheets) and manual feed tray.
5. The copier is provided with a full range of basic features.
   - Produces as many as 40 copies (A4, horizontal) per minute.
   - Reduces or enlarges between 50% and 200%; in addition, has eight fixed reproduction ratios.
   - Accepts paper from as large as A3 to as small as postcards; medium may be tracing paper, OHP film, or a variety of others.
   - Makes copies in red, blue, green, or brown (mono-color).
   - Has a compact duplexing unit designed with a set-back mechanism.

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II. SPECIFICATIONS

A. System

Item	Description
Copier body	Desk top
Copyboard	Fixed
Light source	Halogen lamp 270 W (100/115V models) 300 W (230V models)
Lens	Zoom lens
Photosensitive medium	OPC

B. Type

Item		Description
Reproduction		Indirect electrophotographic
Charging		Corona
Exposure		Slit (moving light source)
Copy density adjustment		Automatic (AE) or Manual
Development		Dry (black, toner projection; color, two-component)
Pick-up	Automatic	2 cassettes or 4 cassettes
	Manual	Manual
Transfer		Corona
Separation		Corona (electro static separation)
Cleaning		Blade
Fixing		Heat roller (880 W: 230 V, 800 W: 100/115 V)

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C. Performance

Item			Description
Document type			Sheet, Book, 3-D object (2 kg max.)
Document size (max.)			A3 (297 × 420 mm)/LDG (11"× 17")
Reproduction ratio			DIRECT, 4R4E or 2R2E (see Table 1-1), 50% to 200% (ZOOM)
Wait time			4 min (approx., 20°C)
First copy			6 sec or less (A4; non-AE; upper cassette)
Continuous copying			999 (max.)
Copying speed			See Table 1-2.
Copy size			A3/LDG (297 × 431.8 mm; max.) Postcard (100 × 148 mm)
Copy paper type	Cassette		Plain paper (64 to 80 g/m²), Tracing paper, Colored paper*
	Manual		Plain paper (64 to 128 g/m²), Tracing paper, Colored paper*, OHP film*, Commercial postcard*, Label sheet*
	Two-sided/ Overlay copy	Automatic	Plain paper (64 to 80 g/m²), Colored paper*
		Manual	Plain paper (64 to 128 g/m²), Colored paper*, OHP film* (overlay only), Commercial postcard*
Cassette			Clawless, Front loading; 54 mm deep (about 500 sheets of 80 g/m²)
Copy tray			100 sheets (approx.; 80 g/m²)
Non-image width			2.5 ±1.5 mm (leading edge; one-sided), 2.0 ±1.0 mm (left/right; one-sided, two-sided, overlay), 2.5 ±2.0 mm (leading edge; two-sided, overlay)
Auto clear			Available (2 min standard; may be varied between 1 and 9 min in 1-min increments; may be disabled)
Auto shut-off			Available (2 hr standard; may be disabled)
Weekly shut-off			Available (set in 1-min increments)
Option			RDF-B1/RDF-B1 Image Editing Unit, Stapler Sorter-A1**, Sorter-A1, Auto Stapler Folder-A1, Auto Stapler-A1, Sorter 20-B1**, Control Card V, NP Image Editing Unit, Cassette Pedestal-D1, Paper Deck Pedestal-D1, CD unit Changer-A1, IC Card-A1

*Of a type recommended by Canon.
**No tandem configuration.

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D. Others

Item		Description	
Operating environment	Temperature	15° to 30°C	
	Humidity	5% to 80%	
	Atmospheric pressure	0.6 to 1 atm	
Power source		Serial No.	
	220V 50 Hz	PAD xxxxx PET xxxxx	
	240V 50 Hz	RAC xxxxx RET xxxxx	
	220V 50 Hz	UAE xxxxx UET xxxxx	
Power consumption	Maximum	1.5 kW or less	
	Standby	0.171 kWh (approx., average; reference only)	
	Continuous copying	1.013 kWh (approx., average; A4; reference only)	
Noise	Copying	71 dB or less	Sound power level as prescribed by ISO.
	Standby	As prescribed by ISO (50 dB or less)	
Ozone (average over 8 hr)		0.1 ppm or less	
Dimensions	Width	760 mm	
	Depth	690 mm	
	Height	623 mm*, 958 mm**	
Weight		95 kg* (approx.)	
Consumables	Copy paper	Keep wrapped to protect against humidity.	
	Toner	Avoid direct sunlight; keep it under 40°C, 85% or less.	

*Copyboard type, including 2 cassettes.
**Copyboard type, including 4 cassettes.

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DIRECT	REDUCE	ENLARGE	
1:1 (±0.5%)	1:0.500 1:0.707 1:0.816 1:0.865	1:1.154 1:1.224 1:1.414 1:2.000	4R4E
	1:0.500 1:0.707	1:1.414 1:2.000	2R2E

Table 1-1 Fixed Reproduction Ratios

Reproduction ratio		Copy size	Copies/min
DIRECT	1:1 (±0.5%)	A3 (297 × 420 mm)	23
		A4 (210 × 297 mm)	40
		B4 (257 × 364 mm)	26
		B5 (182 × 257 mm)	40
		A4R (297 × 210 mm)	31
		B5 (257 × 182 mm)	35
REDUCE	1:0.707 (±1.0%)	A3 → A4R	29
		B4→ B5R	33
	1:0.816 (±1.0%)	B4 → A4R	30
	1:0.865 (±1.0%)	A3 → B4	25
		A4 → B5	40
ENLARGE	1:1.414 (±1.0%)	A4R → A3	23
		B5R → B4	26
	1:1.224 (±1.0%)	A4R → B4	26
	1:1.154 (±1.0%)	B4 → A3	23
		B5 → A4	40

Table 1-2 Copying Speeds

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E. Cassette Feeding Unit

Type of copy paper	Same as copier.
Cassette	Same as copier.
Power supply	24 VDC (from copier)
Dimensions	700 (W) x 575 (D) x 337 (H) mm
Weight	27 kg

F. Paper Deck Pedestal

Type of copy paper	A4, B5, LTR (plain paper, 64 to 80 g/m^2, colored paper*)
Deck	No claw, Front loading; 162 mm deep (max; about 1500 sheets of 80g/m^2)
Power supply	24 VDC (from copier)
Dimensions	702.5 (W) x 575 (D) x 335.4 (H) mm
Weight	42 kg

* Of a type recommended by Canon.

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G. Image Editing Unit

Effective area	297 × 432 mm
Area accuracy	±1.00 mm (editor only; excluding input inaccuracies of the pen or other controlling unit)
Input	by pen; beep upon input
Areas	8 max. (diagonal; 16 max. if by multiple points)
Image conversion	Framing, Masking, 2-color
Text input	18 characters/line (max.) × 3 lines; up to 3 units; orientation (vertical, horizontal) may be specified; output position may be specified; color may be specified; text may be combinations of alphabets and numerals
Stamp	1 (of 5 types; up to 3 types may be stored); orientation (vertical, horizontal) may be specified, output position may be specified, color may be specified
Screen	all or 4 areas
Highlight	4 areas max.; color may be specified; shading, solid, frames
Power supply	5 V (front copier)
Weight	3 kg
Dimensions	555 (W) × 490 (D) × 43 (H) mm

H. CD Unit Changer

Number of CD units	3 (max.)
Control panel	CD UNIT POSITION indicator, CD UNIT OUT key, CD UNIT SELECT key, CD UNIT COLOR indicator
Switching time	28 sec max.
Noise	55 dB or less
Power supply	24 VDC (from copier)
Dimensions	285/245* (W) × 625 (D) × 365 (H) mm **Including the manual feed tray.*
Weight	20 kg

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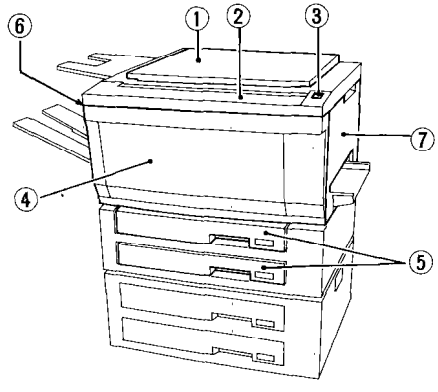
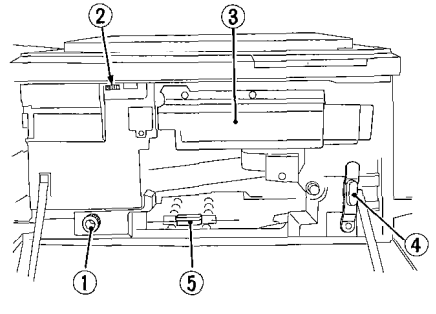
III. NAMES OF PARTS

A. External View



① Copyboard cover
② Control panel
③ Power switch
④ Front door
⑤ Cassettes
⑥ Copy tray
⑦ CD unit door

Figure 1-1



① Fixing assembly knob
② Total copy counter
③ Hopper
④ Feeder assembly release lever
⑤ Lower feeder assembly lever

Figure 1-2

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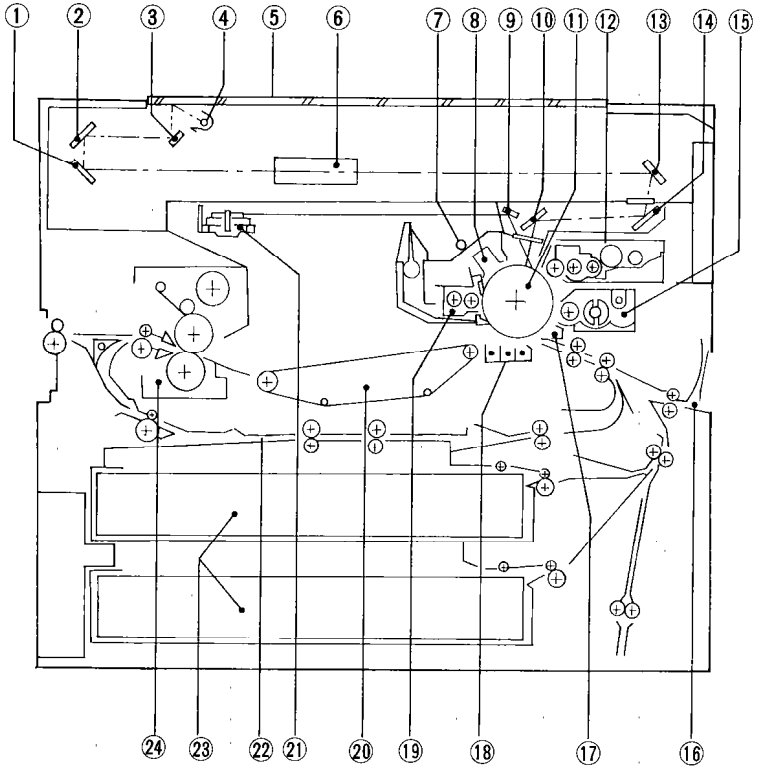
B. Cross Section

1. Copier Body



① No. 3 mirror
② No. 2 mirror
③ No. 1 mirror
④ Scanning lamp
⑤ Copyboard glass
⑥ Zoom lens
⑦ Pre-exposure lamp
⑧ Primary corona assembly
⑨ Laser mirror
⑩ No. 6 mirror
⑪ Photosensitive drum
⑫ CD unit
⑬ No. 4 mirror
⑭ No. 5 mirror
⑮ Black developing assembly
⑯ Manual feed pick-up assembly
⑰ Pre-transfer corona assembly
⑱ Transfer/Separation corona assembly
⑲ Drum cleaning assembly
⑳ Feeder assembly
㉑ Laser scanner
㉒ Lower feeder assembly
㉓ Cassettes
㉔ Fixing assembly

Figure 1-3 Cross Section of Copier Body

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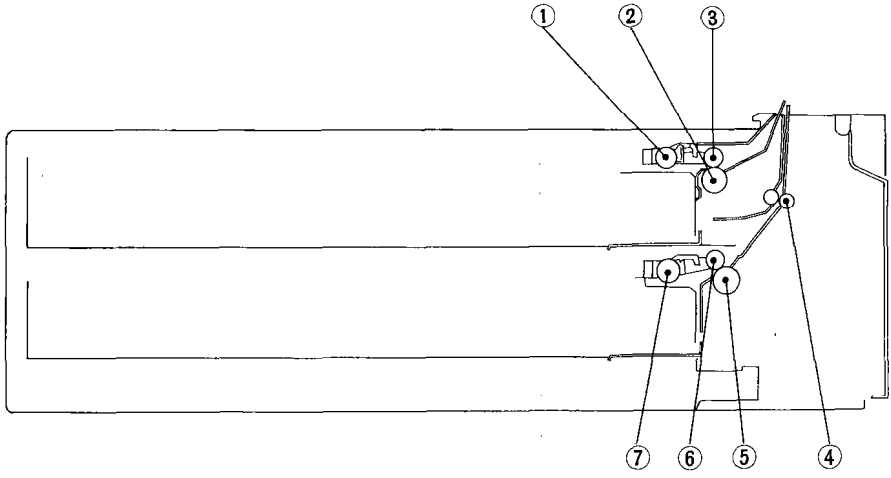
2. Cassette Feeding Unit (3rd/4th cassette)



① Cassette 3 pick-up roller
② Cassette 3 separation roller
③ Cassette 3 feeder roller
④ No. 4 registration roller
⑤ Cassette 4 separation roller
⑥ Cassette 4 feeder roller
⑦ Cassette 4 pick-up roller

Figure 1-4 Cross Section of Cassette Feeding Unit (3rd/4th cassette)

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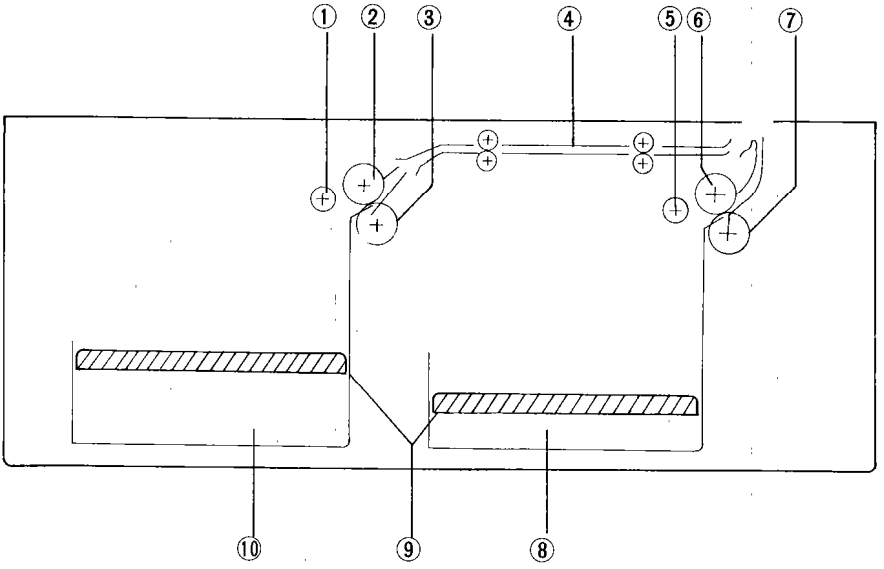
3. Paper Deck Pedestal



① Pick-up roller (left deck)
② Feeder roller (left deck)
③ Separation roller (left deck)
④ Left feeder assembly
⑤ Pick-up roller (right deck)
⑥ Feeder roller (right deck)
⑦ Separation roller (right deck)
⑧ Right deck
⑨ Lifter
⑩ Left deck

Figure 1-5 Cross Section of Paper Deck Pedestal

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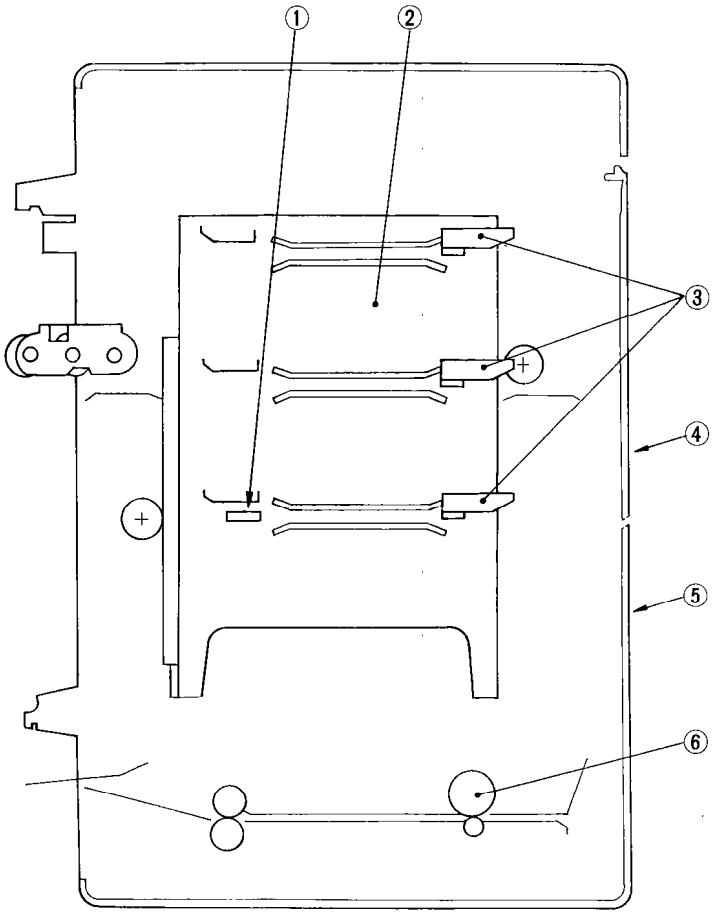
4. CD Unit Changer



① Feeder gear
② Compartment
③ CD unit claw
④ CD unit door
⑤ Manual feed door
⑥ Manual feed skew roller

Figure 1-6 Cross Section of CD Unit Changer

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IV. OPERATION

A. Control Panel

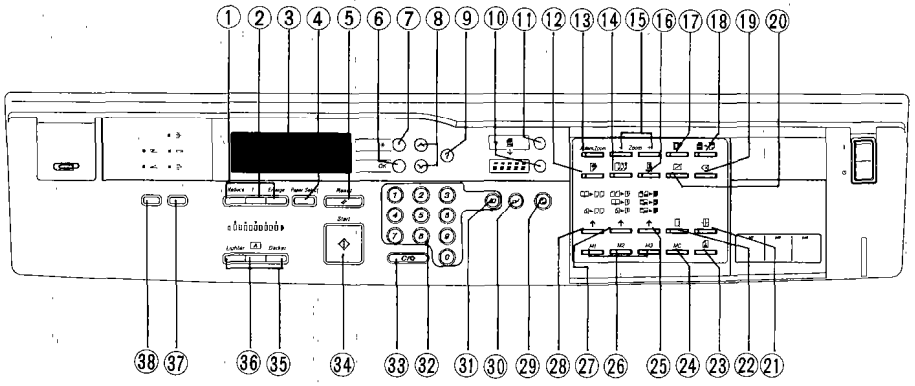

Figure 1-6

① REDUCE/ENLARGE keys
② DIRECT key
③ Message display
④ PAPER SELECT key
⑤ RESET key
- Standard Mode

repro ratio:	100%
paper select:	auto
copy count:	1
copy color:	black
density:	AE

⑥ OK key
⑦ ASTERISK key
⑧ SCROLL keys
⑨ GUIDE key
⑩ COLOR SELECT key
⑪ AUTOMATIC COLOR REPRODUCTION key
⑫ HEADLINE key
⑬ AUTO REPRO RATIO key
⑭ NUMBERING key
⑮ ZOOM keys
⑯ DATE/TIME key
⑰ FREEHAND EDITING key
⑱ COLOR EDIT key
⑲ JOB CHANGE key
⑳ AREA DESIGNATION key
㉑ MARGIN key*
**Adjustable between 1 and 20 mm in increments of 1 mm*
㉒ ERASE key
- sheet frame
- document frame

㉓ PHOTO key
㉔ MC key
Use it to read data from an IC card.
㉕ OVERLAY key
㉖ COPY MODE MEMO key
㉗ TWO-SIDED key
㉘ TWO-PAGE SEPARATE key
㉙ STANDBY (pre-heat)key
- Wen ON, indicators on the control panel are OFF; the fixing temperature is controlled to 10°C lower than when in normal standby.

㉚ INTERRUPT key
- Use it during continuous copying operation; for one copy only.

㉛ ID key
㉜ NUMBER keypad
㉝ CLEAR/STOP key
㉞ COPY START key
㉟ COPY DENSITY keys
- normally, 9 steps
- may be 17 steps (service mode)

㊱ AE key
㊲ SORT/STAPLE/GROUP key
㊳ FOLD key

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B. Making Copies

1) Press the POWER switch to the ' I 'position.
   - The WAIT indicator starts to glow green when the temperature of the fixing assembly reaches a specific value.
   - Normally, the wait time is about 4 min (at 20°C ambient temperature).
2) Lift the copyboard cover, and place the document face down along the size index.
3) Select the cassette holder if to specify the size of the copy.
   - Replace the cassette if necessary.
4) Press the DIRECT, REDUCE, ENLARGE, or ZOOM key as needed.
5) Press the COPY DENSITY key to suit the density of the document.
   - For a darker copy, press the *darker* key, thereby moving the index to the right; for a lighter copy, press the *lighter* key to move the index to the left.

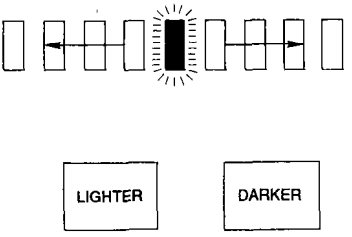

Figure 1-7

6) Enter the number of copies to make (1 to 999) using the numeric keypad, and check the input on the copy count display.
   - If the numeric keypad does not work or to correct a mistake, press the CLEAR/STOP key and re-enter the count.
7) Press the COPY START key.
   - The machine has an auto start mode and remenbers a press on the COPY START key made during the wait state.
   - If the RDF is attached, the documents on the document tray are picked up automatically and copying operation starts.
   - Copies are made in the specified number.
   - Except the CLEAR/STOP, RESET, COPY DENSITY and INTERRUPT keys, all other keys are disabled between the first and last copies.
   - The automatic density adjustment mechanism may be switched to manual density adjustment between the first and the last copies; the manual density adjustment mechanism, however, cannot be switched to automatic density adjustment.

Note:
If the copies are too dark or too light in the AE mode, press the COPY DENSITY key to make adjustments while referring to copies made in the AE mode.

   - To stop continuous copying operation, press the CLEAR/STOP key or the RESET key; the copying operation will stop after finishing the on-going copy run.
   - The copy count display after each copying operation indicates the initial setting. If the ADD PAPER indicator goes ON and the copying operation stops in the middle of copying operation, the remaining number of copies will be made automatically when the COPY START key is pressed after adding paper.
   - If a jam occurs in the middle of copying operation, the JAM message is indicated on the message display and copying operation stops. When the jam is removed, the copy count display shows the remaining number of copies.
   - The machine returns to the standard mode about 2 minutes* after copying operation or key operation.
     **Variable.* (☒ → 13 → OK)

Note:
i. Feed postcards vertically.
ii. Feed A4 label sheet horizontally.

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C. Auto Start Mode

The auto start mode may be activated while the copier is in the following wait states, during the wait period after power-on, during the wait period after deactivation of the pre-heat mode, and during the cleaning operation of the wire.

Set the documents and the copy modes during the wait period, and press the COPY START key.

The WAIT indicator will change from green to orange to indicate that the auto start mode has been activated; no interrupt command will be accepted.

Copying operation will start automatically using the pre-selected copy modes as soon as the copier enters the standby mode.

The automatic start mode may be deactivated using the CLEAR/STOP key or the RESET key.

D. Making Two-Sided/Overlay Copies Manually

Two-sided or overlay copies may be made manually; note the following:

i. Orient the copy correctly; i.e., turn over the copy without changing its rear/front orientation.
ii. Make sure that the paper is not moist.
iii. Make sure that the paper is not curled.
iv. Cool the copy sufficiently after first copy run, and correct the curl, if any, before the second copy run (OHP film, in particular).
v. Use paper of 60 to 120g/m².

E. Automatic Color Reproduction Mode

When copying a document prepared in black and red, press the AUTO COLOR REPRODUCE key; a two-color copy will be made automatically.

The red areas of the document will be of the color of the CD unit selected at the time on the copy; use the COLOR SELECT key as desired.

If a CD unit changer is set, the red areas may be copied in the specified color.

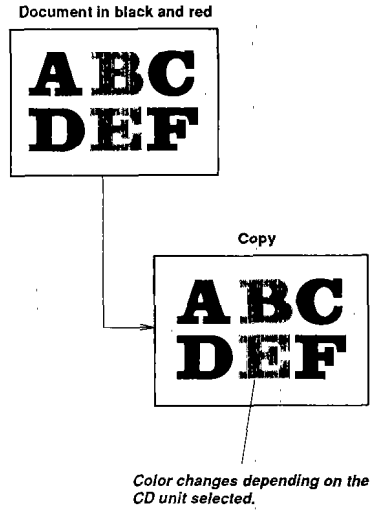

Figure 1-9

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F. Red Elimination Mode/Red Extraction Mode

When copying a document prepared in black and red, press the COLOR EDIT key to produce copies ignoring the areas in red or copies with the red areas only. The color of such areas, however, depends on the CD unit specified at the time.

If a CD unit changer is set, the red areas may be reproduced in any specified color.

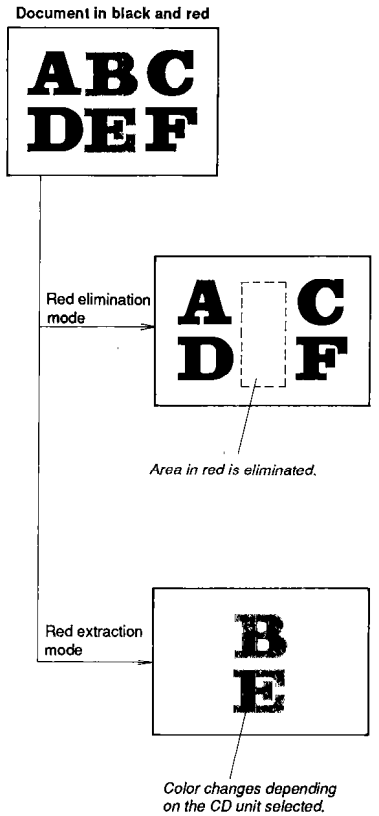

Figure 1-10

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G. Freehand Editing Mode

Enclose any part of the document using a red felt marker to make use of the following modes:

1 framing
2 blanking
3 color conversion
4 highlighting
5 negative/positive reversal

Make sure that the line enclosing the area is solid; the area will not be identified if a break exists in the line. Multiple areas may be selected.

If you are using color conversion mode, do not fill the area with a red felt marker; otherwise, color conversion will not take place.

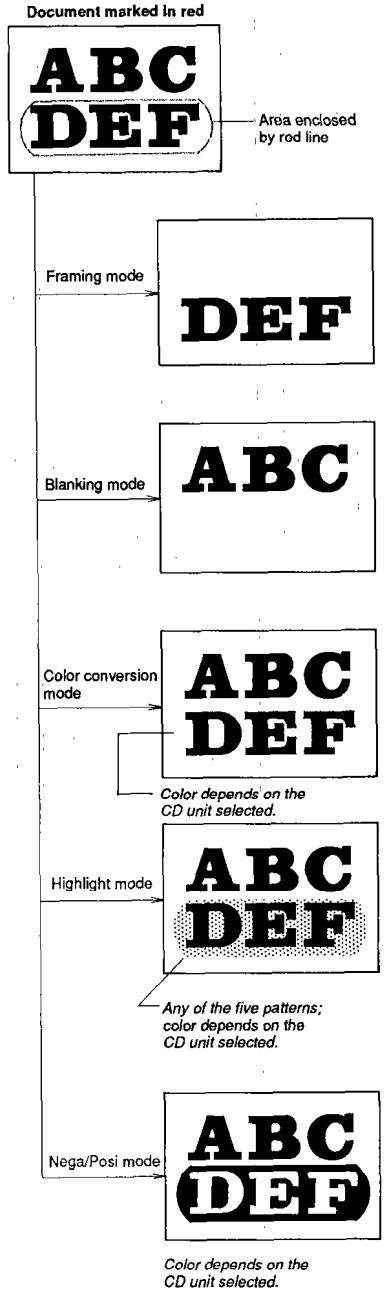

Figure 1-11

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H. Numbering Mode

Page numbers may be placed at a fixed position on the copies.

Manual: Enter the number of the last page; be sure to make copies starting with the last page to be copied first in sequence.

Using Feeder: Set the document on the document tray, and press the COPY START key; the pages will be counted automatically and, then, the copies will be numbered automatically.

See Note.

I. Headline Mode

A headline (message) may be placed at a fixed position on the copies. Select any of the headlines (5 max.) stored* in advance and make copies.

**In the asterisk mode.*

The stamps stored in the editor may be selected for this mode; stamps may still be used on a copier without an editor.

See Note.

Note:
The numbering mode, headline mode, and date mode cannot be used at the same time with the red extraction mode or freehand editing mode, e.g., framing, blanking, color conversion, and negative modes.

J. Date/Time Mode

The current date/time may be placed on a fixed position on the copies. The notation may be any of the following: If 10:25 of February 22, 1989,

1 1989/2/22
2 2/22 10:25
3 FEB/22/1989
4 22/2/1989

See Note.

■ Output Position for Date, Headline, and Number

- Output Position on A4/A3 Paper

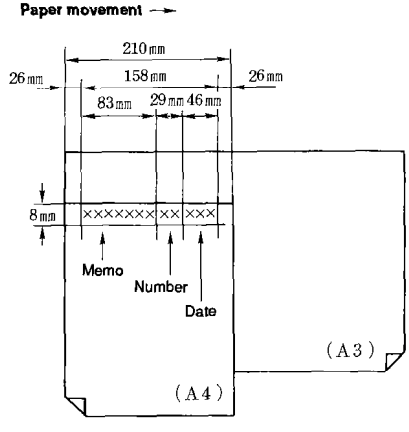

Figure 1-12

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- Output position on B5/B4 Paper

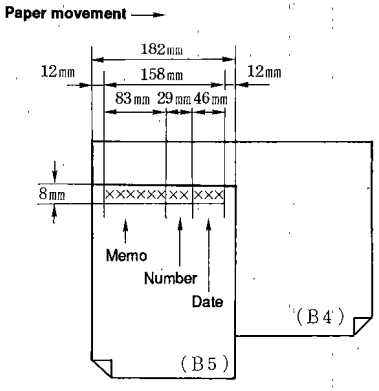

Figure 1-13

- Output Position on A4R Paper

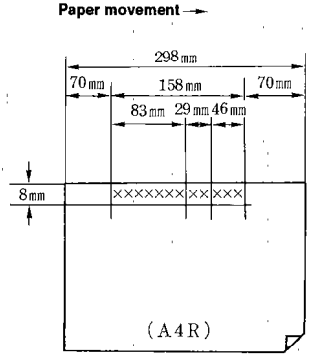

Figure 1-14

- Output Position on B5R Paper

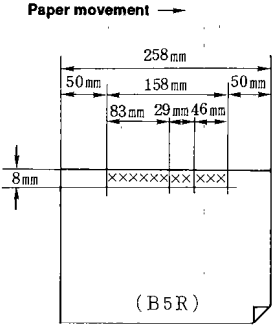

Figure 1-15

If the two-sided mode is specified, the date, headline, and number are placed at the same position on both face and back.

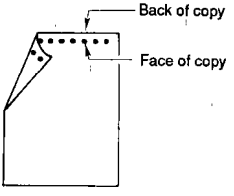

Figure 1-16

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K. Specifying an Area

As many as eight rectangles may be specified on the document as areas. *If the screen mode is used at the same time, no more than four areas may be specified. Further, if the automatic color reproduction mode, red elimination/extraction mode, or marker mode is used, no area may be specified.*

If the area represents a combination of rectangles, up to 16 points may be made.

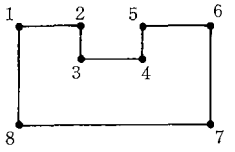

Fig. 17 Rectangle with 8 Points

a. Framing Mode

If the CD unit changer is used, up to four colors may be specified.

b. Blanking Mode

When the number mode, headline mode, or date/time mode is used, no more than seven areas may be specified.

c. Multi-Color Mode

① If the CD unit changer is used, up to four colors may be specified.

② If the number mode, headline mode, or date/time mode is specified, no more than seven areas may be specified.

L. Modes Available With Image Editing Unit

1. Stamp Mode

Up to three types of stamp may be placed on the copies; the position of the stamps is discretionary.

As many as ten stamps may be stored on each IC card (option); the copier also allows the use of IC cards intended for the NP-4835i, but the output size may vary.

2. Character Input Mode

Text may be placed on the copies; the position of the text is discretionary.

- Type of Text
  characters/symbols found in the editor's character list
- Number of Characters
  18 chrs × 3 lines (3 locations max.)
- Size of Character
  4 mm × 4 mm

3. Highlight Mode

Any one of the following three modes may be used in areas specified on the document:

① Shading (4 types)
The area to be shaded will be in the specified color.

② Solid (1 type)
The area to be painted will be in the specified color.

③ Frame (3 different widths)
The area will be framed in the specified color.

The highlight may be over up to four areas and two colors; with a CD unit changer, up to three colors.

4. Screen Mode

Up to four areas may be specified for the screen mode.

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M. Storing the ID Mode

As many as 25 4-digit ID numbers may be stored; copies may be made only in response to any of the stored numbers, and an accumulative count of copies under each number may also be obtained.

■ Registering an ID No.

1) Press the ✳, ID, AUTO ZOOM, and ✳ keys in sequence.

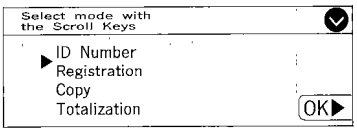

Figure 1-18

2) Press the OK key.
3) Enter an ID No. using the numeric keypad.

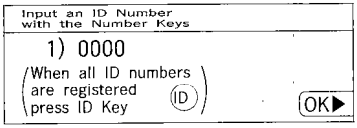

Figure 1-19

4) Press the OK key; advance the group No., and enter another ID No. Repeat the operation as necessary.
5) Press the ID key to store all ID Nos.

■ Controlling the Copy Volume

An accumulative count of copies made under each ID No. may be obtained as follows:

1) Press the ✳, ID, AUTO ZOOM, ✳, and ▽ keys in sequence.
2) Select the copy totalization, and press the OK key.
3) Select the Display Totals by group, and press the OK key.

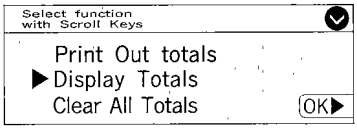

Figure 1-20

4) Press the ▽ key to bring up the desired group and count.

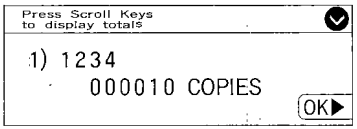

Figure 1-21

5) Press the OK key to return to the standard screen.

Note:
The counts cannot be returned to '0' individually; selecting the 'COUNT ALL CLEAR' and pressing the OK key will set all counts to '0'.

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N. Using the Asterisk (User) Mode

The machine is equipped with the asterisk (user) mode, by which the user can store settings of his or her choice.

<table>
<tr><th>Key operation</th><th>Description</th><th>Remarks</th></tr>
<tr><td>[*] → [1] → [OK]</td><td>• Mode Memory
As many as three copy modes may be stored for use in the future; with an IC card, up to ten.</td><td>1) Press the desired copy mode keys.
2) Press the * key.
3) Select 'STORE MODE MEMORY'.
• If for an IC card, select the IC card.
4) Press the COPY MODE MEMO key (M1, M2, or M3), or select one from MC1 through MC10.
5) Press the OK key.</td></tr>
<tr><td>[*] → [2] → [OK]</td><td>• ZOOM Program
Enter the size of the document and the desired size of copies; the mechanism will select the best reproduction ratio automatically.</td><td>If the result of computation is 50% or less, 50% will be selected; if 200% or more, 200% will be selected.</td></tr>
<tr><td>[*] → [3] → [OK]</td><td>• Left/Right Margin
For the margin mode, the position of the binding margin may be specified in terms of priority; in the two-page separation mode, the page orientation may be specified in terms of left or right page.</td><td><table><tr><th></th><th>Left binding</th><th>Right binding</th></tr><tr><td>Binding margin</td><td>Left binding margin</td><td>Right binding margin</td></tr><tr><td>Two-Page separation</td><td>Left page first</td><td>Right page first</td></tr></table>Normally, left binding is selected.</td></tr>
<tr><td>[*] → [4] → [OK]</td><td>• Auto Original Count
When setting documents on the RDF and making two-sided copies from one-sided documents, the documents are counted first before copying operation; if an odd number of pages, the last page will be copied as if in the one-sided copy mode so that the first page will be on the face of the copy; this mechanism may be disabled.</td><td></td></tr>
<tr><td>[*] → [5] → [OK]</td><td>• Headline
Use it to store a message (headline) to be placed at a fixed position on the copies.</td><td>Up to 20 characters per line may be stored; up to five messages may be stored.</td></tr>
<tr><td>[*] → [6] → [OK]</td><td>• Group Numbering Mode
Use it to place group numbers* at a fixed position on the copies.
*Number of pages (constant).</td><td>The output of the group numbers and the output of the page numbers in the numbering mode are placed at the same position; this mode, therefore, is not available if the numbering mode is used.</td></tr>
</table>

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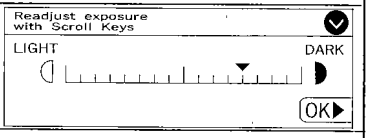
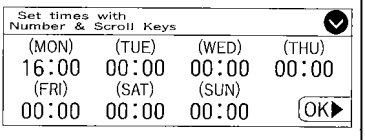
Key operation	Description	Remarks
[*] → [7] → [OK]	• Character Priority Mode Use it to give priority to characters over images on the document; the image of the document will be erased to make room for characters.	This mode does not apply if an area is specified.
[*] → [8] → [OK]	• Stamp Cover/All-Page Use it to specify if the stamp (stamp mode) should be placed on the first page only or on all pages when using a RDF.	Without specification, the stamp will be placed on the first page (cover) only.
[*] → [9] → [OK]	• Character Cover/All-Page Use it to specify if the characters (character mode) should be placed on the first page only or on all pages when using a RDF.	Without specification, the characters will be placed on the first page (cover) only.
[*] → [10] → [OK]	• Exposure (density) Recalibration If the copies are too dark or too light after density adjustment, this mode enables finer adjustment.	
[*] → [11] → [OK]	• Cleaning the Corona Wires Using this mode, it is possible to have the machine clean the primary, transfer, and separation corona wires automatically.	
[*] → [12] → [OK]	• Feeder Cleaning (RDF) Set 10 blank sheets of copy paper on the feeder tray, and press the OK key. The sheets are fed in the 'one-sided to one-sided' mode to clean the separation belt and the feeder roller.	
[*] → [13] → [OK]	• Auto-Clear Time The auto-clear time may be set between 1 and 9 min in 1-min increments. Setting the time to 0 min disables the mechanism.	*Set to 2 minutes at time of shipment.*
[*] → [14] → [OK]	• Auto Shut-Off Time The auto shut-off time may be set for each day of the week; setting the time to '00:00' disables the mechanism, and any wrong setting also disables the mechanism.	
[*] → [15] → [OK]	• Date and Time With this mode, the year, month, day, and time stored in the built-in clock may be adjusted.	

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V. WARNINGS AND CORRECTIONS

A. JAM Message

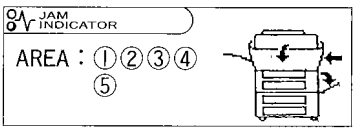

Figure 1-22

The message comes on in response to a jam in the machine; remove the jam as described below.

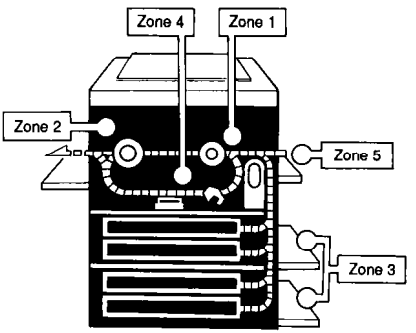

Figure 1-23

1. Removing Jam from Zone 1

1) Turn the feeder assembly release lever counterclockwise, and remove the copy paper.

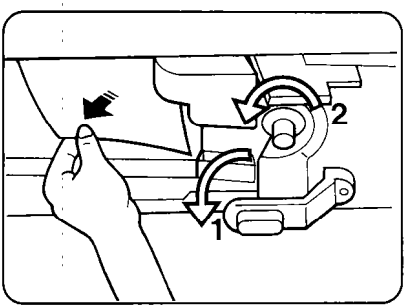

Figure 1-24

2. Removing Jam from Zone 2

1) Shift the lower feeder lever up, and remove the copy paper.
2) Detach the copy tray, and open the delivery assembly. If the paper is trapped in the fixing assembly, turn the fixing assembly knob counterclockwise, and remove the jam.

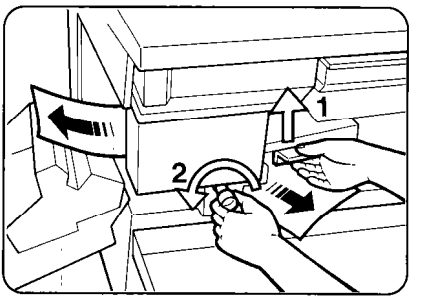

Figure 1-25

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3. Removing Jam from Zone 3

1) Open the upper right door or lower right door of the cassette assembly, and remove the copy paper. If the copy paper cannot be removed, slide out the cassette, and remove the paper.

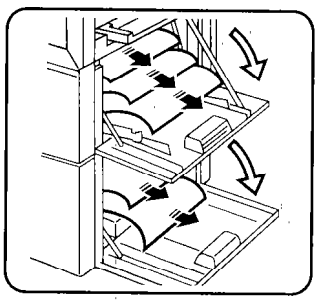

Figure 1-26

4. Removing Jam from Zone 4

1) Lift the lever of the lower feeder assembly, and remove the copy paper.

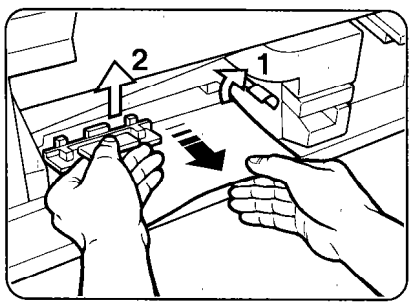

Figure 1-27

5. Removing Jam from Zone 5

1) Lift the manual feed tray cover, and remove the copy paper.

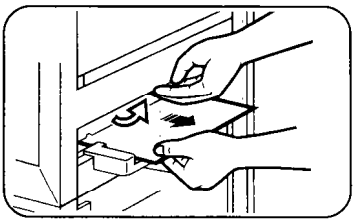

Figure 1-28

6. Jam in Paper Deck Pedestal

1) Open the copier's front door.
2) Open the lower right door of the deck assembly.

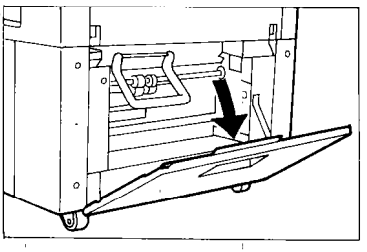

Figure 1-29

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3) Bring down the green grip, and remove the jam.

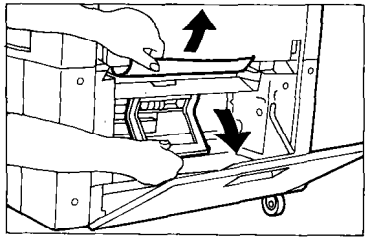

Figure 1-30

4) Slide out the right deck, and remove the jam.

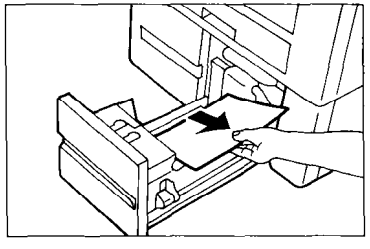

Figure 1-31

5) Slide out the left deck, and remove the jam.

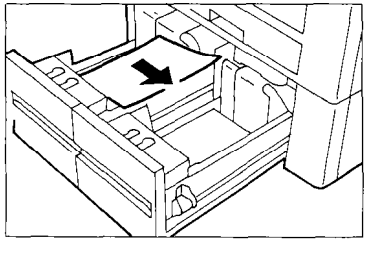

Figure 1-32

6) Hold the grip of the left feeder assembly, and slide the assembly until it stops.

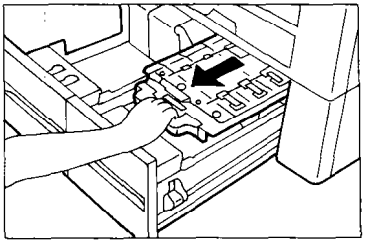

Figure 1-33

7) Bring up the knob on the left feeder assembly, and remove the jam.

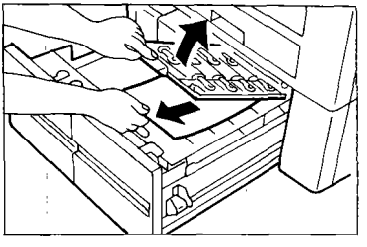

Figure 1-34

8) Slide the left feeder assembly and the left/right deck into their original positions.
9) Close the lower right door of the deck assembly.
10) Close the copier's front door.

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B. LOAD PAPER Message

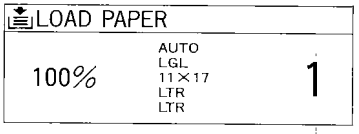

Figure 1-35

The message comes on when the cassette has run out of paper; perform the following steps:

1. Cassette

1) Hold the grip of the selected cassette, and slide the cassette to the front as far as it moves.
2) Set copy paper in the cassette; keep the side next to the seam of the wrapper facing down.

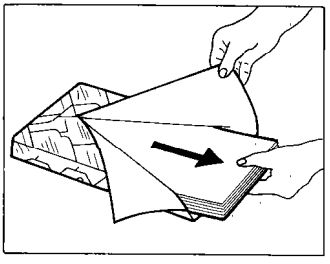

Figure 1-36

3) Place the copy paper on the lifting plate of the cassette, and keep the leading edges of the sheets together.

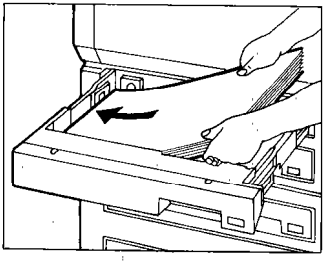

Figure 1-37

4) Set the cassette in the machine.

2. Adding Paper to the Paper Deck Pedestal

1) Hold the grip on the paper deck, and slide the deck to the front until it stops.

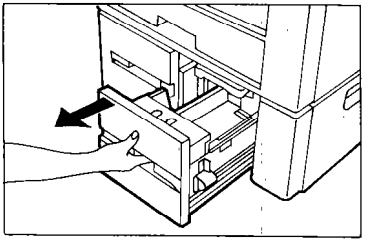

Figure 1-38

2) Take out copy paper from its package, and set it in the deck; keep the side next to the seam of the wrapper facing down.

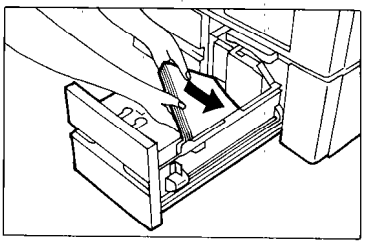

Figure 1-39

3) Slide the deck back into its original position.

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C. ADD TONER Message

1. Adding Black Toner

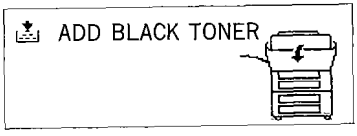

Figure 1-40

The message comes on when the toner has run out; perform the following steps:

1) Open the front door.
2) Slide the hopper unit to the front.

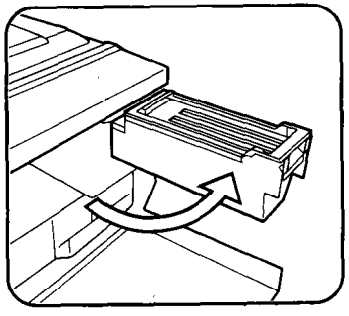

Figure 1-41

3) Shake the toner cartridge left and right several times.

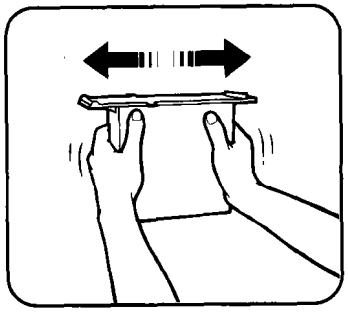

Figure 1-42

4) Fit the boss of the toner cartridge into the groove along the rear of the hopper unit; listen for a click.

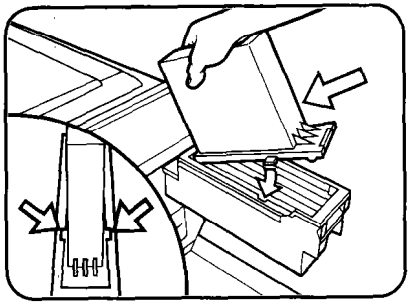

Figure 1-43

5) Hold the toner cartridge, and pull the grip of the hopper to the front until the seal stopper of the cartridge comes into view.

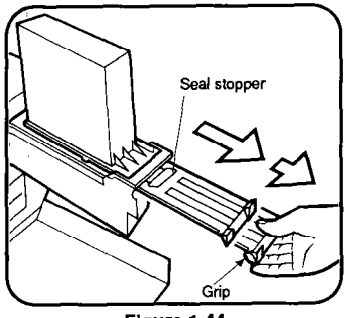

Figure 1-44

6) Hold the seal stopper, and slide it to the front until the STOP mark comes into view.

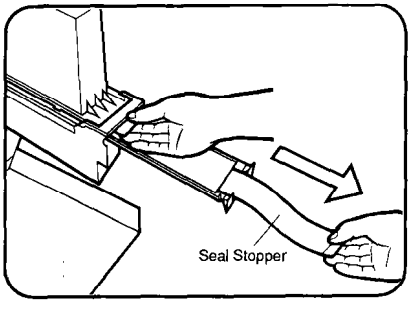

Figure 1-45

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7) Tap on the top of the toner cartridge lightly until all toner inside the cartridge has dropped into the hopper unit.
8) Push the grip of the hopper to the rear until a click is heard, i.e., until the cartridge becomes unlocked.
9) Tilt the toner cartridge lifting its front, and pull the seal stopper out of the hopper unit carefully.
10) Set the hopper unit to the machine.
11) Close the front door.

Note:
For black toner used at time of installation, see CHAPTER 5.

2. Adding Color Toner

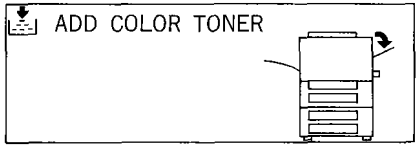

Figure 1-46

The message appears when the color toner has run out; check the color of the toner, and replenish as follows:

1) Open the CD unit door.
2) Hold the grip, and slide out the CD unit.
3) Open the toner supply cover of the CD unit.

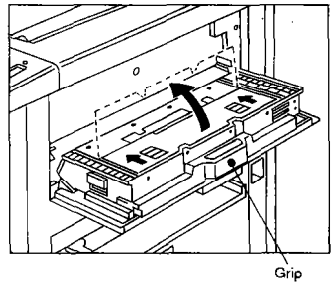

Figure 1-47

4) Make sure that the new toner cartridge contains toner of the desired color, and shake it back and forth about ten times.
5) Hold the toner cartridge flush with the CD unit, and remove the seal while holding the cartridge.
6) Tap on the top of the toner cartridge lightly so that all toner in the cartridge falls into the CD unit.
7) Hold the toner cartridge, and detach it carefully.
8) Close the toner supply cover, and lock it.
9) Set the CD unit in the copier.

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VI. ROUTINE MAINTENANCE BY THE USER

Advise the user to clean the following at least once a week.

(1) *Copyboard Glass*
Clean it with a moist cloth; then, dry wipe it.

(2) *Copyboard Cover*
Clean it using mild detergent solution; then, dry wipe it.

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VII. ⚠ LASER BEAM SAFETY

A. Safety

This copier has been approved as Class 1 equipment according to the rediation performance standards issued by the US Department of Health and Human Services (DHHS) in 1968.

This means that this copier does not produce harmful laser beams.

The laser scanner of this copier is completely enclosed by the protective housing and the external cover, so there is no possibility of laser beam leakage while the user is operating the copier.

B. CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the US Food and Drug Administration issued regulations on equipmant using lasers on August 2, 1976.

The regulations apply to all equipment using lasers manufactured after August 1, 1976, and prohibit sale of equipment not complying with them within the United States.

Figure 1-48 shows the label indicating compliance with the CDRH regulations which must be attached to equipment for sale in the United States.

CANON
30-2, SHIMOMARUKO, 3-CHOME, OHTAKU, TOKYO, 146, JAPAN.
MANUFACTURED :
THIS PRODUCT CONFORMS WITH CDRH RADIATION PERFORMANCE STANDARD 21CFR CHAPTER 1 SUBCHAPTER J.

Figure 1-48

Note:
The text may vary in parts for different product models.

C. Laser Unit Operation

Particular care should be taken when performing maintenance around the laser scanner unit to avoid inserting tools, such as screwdrivers, with high reflectance directly into the laser beam path.

Watches, rings, etc., should be removed before beginning operation to avoid the danger of reflecting the laser beam into the eyes.

The laser beam is invisible, so special care should be taken when performing maintenance or inspection under the cover to which the lable shown in figure 1-49 is attached.

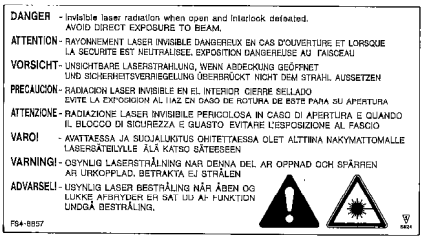
DANGER - Invisible laser radiation when open and interlock defeated. AVOID DIRECT EXPOSURE TO BEAM.
ATTENTION - RAYONNEMENT LASER INVISIBLE DANGEREUX EN CAS D'OUVERTURE ET LORSQUE LA SECURITE EST NEUTRALISEE. EXPOSITION DANGEREUSE AU FAISCEAU
VORSICHT - UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT NICHT DEM STRAHL AUSSETZEN
PRECAUCION - RADIACION LASER INVISIBLE EN EL INTERIOR. CIERRE SELLADO EVITE LA EXPOSICION AL HAZ EN CASO DE ROTURA DE ESTE PARA SU APERTURA
ATTENZIONE - RADIAZIONE LASER INVISIBILE PERICOLOSA IN CASO DI APERTURA E QUANDO IL BLOCCO DI SICUREZZA E GUASTO EVITARE L'ESPOSIZIONE AL FASCIO
VARO! - AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NAKYMATTOMALLE LASERSÄTEILYLLE ÄLÄ KATSO SÄTEESEEN
VARNING! - OSYNLIG LASERSTRÅLNING NAR DENNA DEL AR OPPNAD OCH SPÄRREN AR URKOPPLAD. BETRAKTA EJ STRÅLEN
ADVARSEL - USYNLIG LASER BESTRÅLING NÅR ÅBEN OG LUKKE AFBRYDER ER SAT UD AF FUNKTION UNDGÅ BESTRÅLING.
FS4-8857

Figure 1-49

I. IMAGE FORMATION

A. Outline

The NP-4080 is an electrophotographic copier constructed as shown in Figure 2-1.

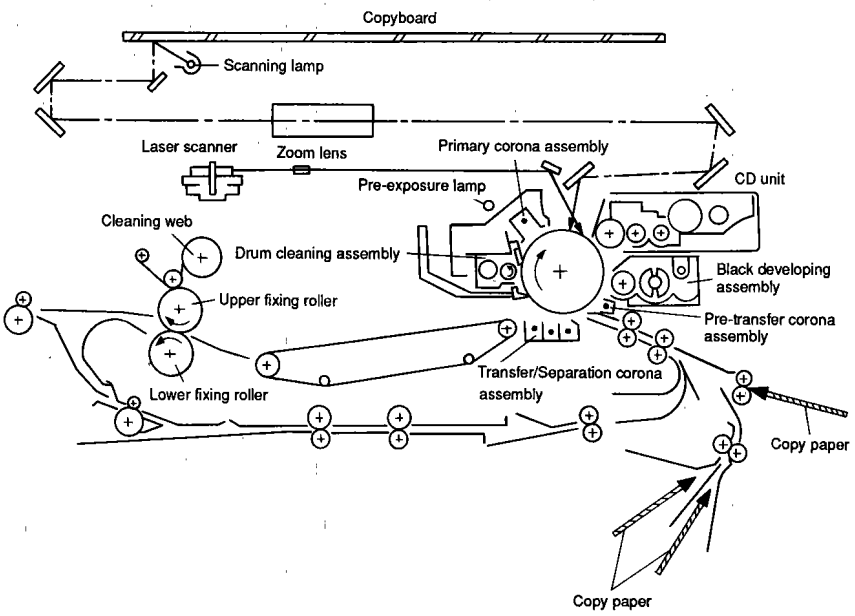

Figure 2-1

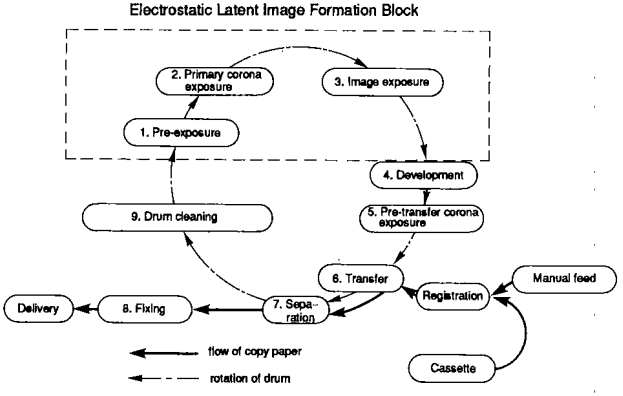

Figure 2-2

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The following nine steps are involved in producing images:

Step 1 Pre-exposure
Step 2 Primary corona exposure (negative DC)
Step 3 Image exposure
Step 4 Development (AC + negative DC bias)
Step 5 Pre-transfer corona exposure (AC + positive DC)
Step 6 Transfer (negative DC)
Step 7 Separation (AC + positive DC)
Step 8 Fixing
Step 9 Drum cleaning

The photosensitive drum consists of two layers; the outer layer is a photoconductive layer made of OPC and the inner layer, a conductive core of aluminum.

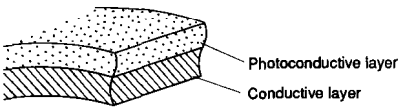

Figure 2-3

B. Electrostatic Latent Image Formation Block

This block consists of three steps during which the negative charges in the areas of the drum surface corresponding to the dark areas of the document are left as they are while those corresponding to the light areas of the document are rid of the negative charges, thereby forming an electrostatic image on the drum surface.

These electrostatic images on the drum surface are not visible to the human eye and, therefore, are called *electrostatic latent images*.

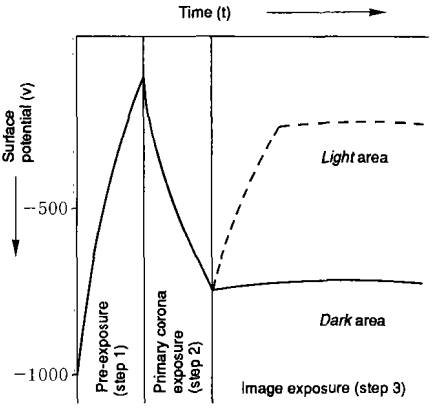

Figure 2-4

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C. Step 1 Pre-Exposure

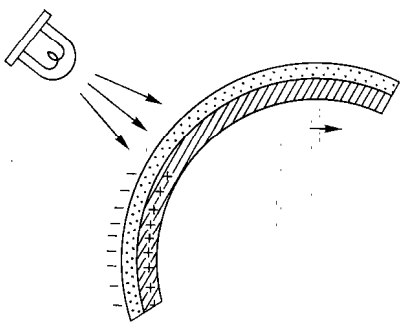

Figure 2-5

Pre-exposure eliminates the residual charges on the drum to prepare for primary corona exposure, thereby ensuring even copy density.

D. Step 2 Primary Corona Exposure

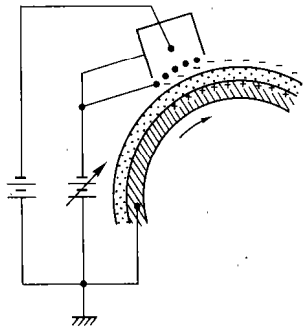

Figure 2-6

Primary corona exposure charges the drum surface to a uniform negative potential.

The surface potential of the drum is dependent on the potential of the grid; and, to ensure stable surface potential of the drum, a bias is applied to the grid.

A voltage equal to that of the grid bias is applied to the shield plate to ensure correct corona discharge from the primary corona assembly.

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E. Step 3 Image Exposure

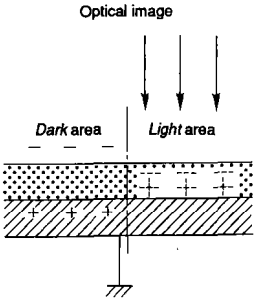

Figure 2-7

The optical image of the document is projected on the drum surface to neutralize the charges in the *light* areas.

F. Step 4 Development

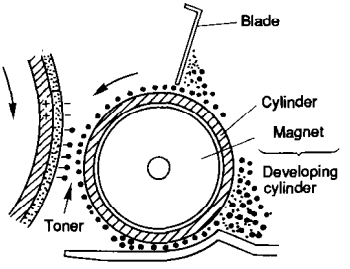

Figure 2-8

As shown in Figure 2-8, the developing assembly consists of a developing cylinder and a magnetic blade; the developing cylinder is made up of a fixed magnet and a cylinder which rotates around the magnet.

The toner (developer) used for the machine is a single-component type, consisting mainly of magnetite and resin. The toner has an insulating characteristic and is charged to a positive potential by friction against the rotating cylinder.

The color developer consists of carrier (iron powder) and toner (resin) mixed in a specific ratio.

The toner and carrier are charged by the friction against the rotating cylinder; toner to positive and carrier, negative.

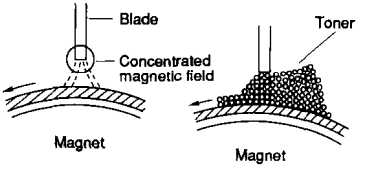

Figure 2-9

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A concentrated magnetic filed develops between the magnet and the tip of the blade, attracting the magnetized toner.

Once inside the magnetic field, the toner becomes virtually immobile because of the strong attraction to the blade.

The toner is then deposited on the cylinder in a thin, even layer.

An AC bias and a DC bias (negative component) are simultaneously applied to the developing cylinder and the blade and, since the negative component is greater than the positive component at any given time, they provide a developing bias.

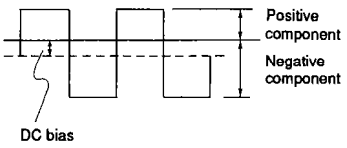

Figure 2-10

During copying operation, the toner is attracted to the photosensitive drum because of the drum surface potential and the development bias (at time of positive), thereby turning the electrostatic latent image into a visible image. Excess toner is then repelled by the photosensitive drum by the work of the drum surface potential and the development bias (at time of negative).

An AC bias, frequency in particular, mostly affects gradation; a lower frequency improves gradation but, at the same time, may fog the copy. A DC bias affects the copy density and, in excess, can cause fogging; a higher DC bias, i.e., closer to 0 V, darkens the image but, on the other hand, can fog the image.

G. Step 5 Pre-Transfer Corona Exposure

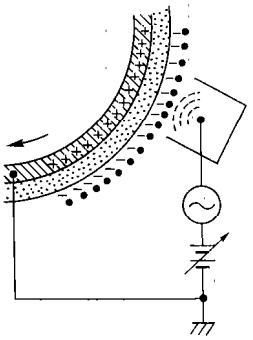

Figure 2-11

The AC corona from the pre-transfer corona assembly, together with a DC bias, increases and optimizes the charge on the toner on the drum surface. The increase improves the transfer and facilitates the separation of the copy paper at the same time.

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H. Step 6 Transfer

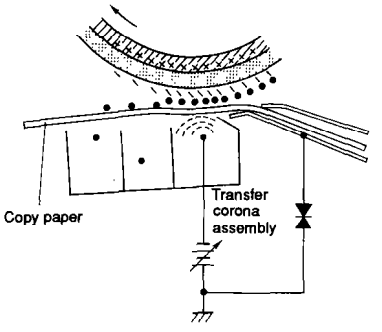

Figure 2-12

A negative corona charge is applied to the back of the copy paper, causing the toner on the drum to move to the copy paper.

The transfer guide is grounded through a varistor to prevent soiling of the back of the copy paper or poor transfer.

Note:
Direct grounding of the transfer guide would let the charges needed on the back of the copy paper to escape, leading to poor transfer; if not grounded, on the other hand, the transfer guide would be charged, attracting toner particles and consequently soiling the back of the paper.

Copy paper coming out of the fixing assembly is dry and has a high resistance. For this reason, during automatic two-sided or overlay copying, the use of the same transfer corona output for both first and second sides of copy paper would cause faulty separation.

To prevent such a problem, the transfer corona output for the second side is made lower than for the first side.

I. Step 7 Separation

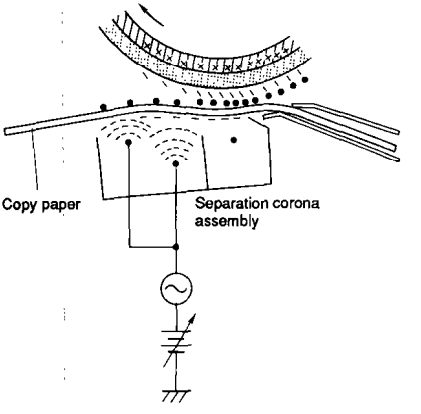

Figure 2-13

The copy paper is charged to a negative potential by the transfer corona and is statically attracted to the surface of the photosensitive drum. To separate the copy paper, the attraction between the drum and the paper is broken by an AC corona charge with a DC bias.

Copy paper coming out of the fixing assembly is dry, has a high resistance, and tends to curl. For this reason, during automatic two-sided or overlay copying, the use of the same separation corona output for both first and second sides of copy paper would cause double transfer.

To prevent such a problem, the positive DC component of the separation corona output for the second side is made lower than for the first side.

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J. Step 8 Fixing

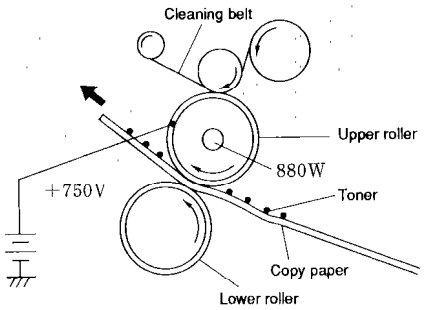

Figure 2-14

After transfer, the copy paper is moved through a pair of heat rollers, during which the toner image is fused into the fibers of the paper.

To prevent jams and toner offset, the upper fixing roller is kept in contact, with the cleaning belt impregnated with silicone oil.

The take-up mechanism moves the belt so that it is supplied with oil and cleans the upper roller while changing its point of contact.

Further, to ensure a constant voltage, the upper fixing roller is given a positive DC bias thereby preventing toner offset.

K. Step 9 Drum Cleaning

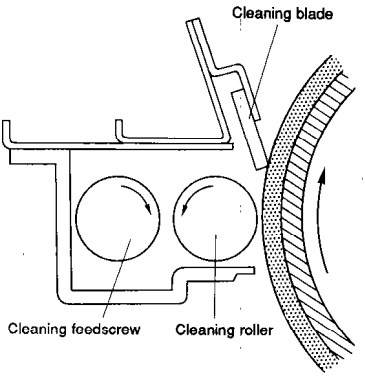

Figure 2-15

The cleaning blade scrapes the residual toner off the drum surface in preparation for the next copy run, ensuring reproduction of crisp images.

The toner scraped by the cleaning blade is sent to the front of the machine by the cleaner feed-screw for collection inside the drum.

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II. AUXILIARY PROCESSES

1. Separation Claw

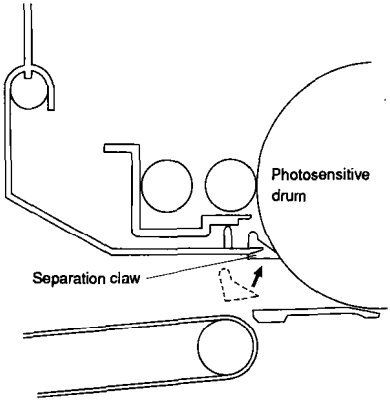

Figure 2-16

Copy paper, if not separated from the photosensitive drum because of faulty pre-transfer or faulty separation corona exposure, tends to move into the drum cleaning assembly. To prevent the problem, the bottom of the drum cleaning assembly is equipped with separation claws to force the paper off the drum.

2. Ozone Filter

The exhaust fan assembly and the feeder fan assembly are equipped with a filter to prevent the ozone occurring in the corona assemblies from leaking outside of the machine.

3. Static Eliminator

The outlet of the delivery assembly is equipped with a static eliminator consisting of a grounded brush to remove the residual charges.

4. Blank Exposure (laser exposure)

The copier exposes the photosensitive drum by laser beams to execute blank exposure.

The laser is ON while the drum is rotating and the document is not exposed, i.e., the scanner is not moving forward; the laser beam removes the charge from the areas of the drum corresponding to non-image areas of the copy, thus preventing adhesion of unwanted toner.

The laser is also caused to go ON to suit the non-image areas determined by the selected reproduction ratio and the width of the copy paper.

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I. FUNDAMENTALS OF OPERATION

A. Basic Construction

The operating mechanisms of the machine can be divided into four main blocks; i.e., pick-up/feeder system, exposure system, image formation system, and control system.

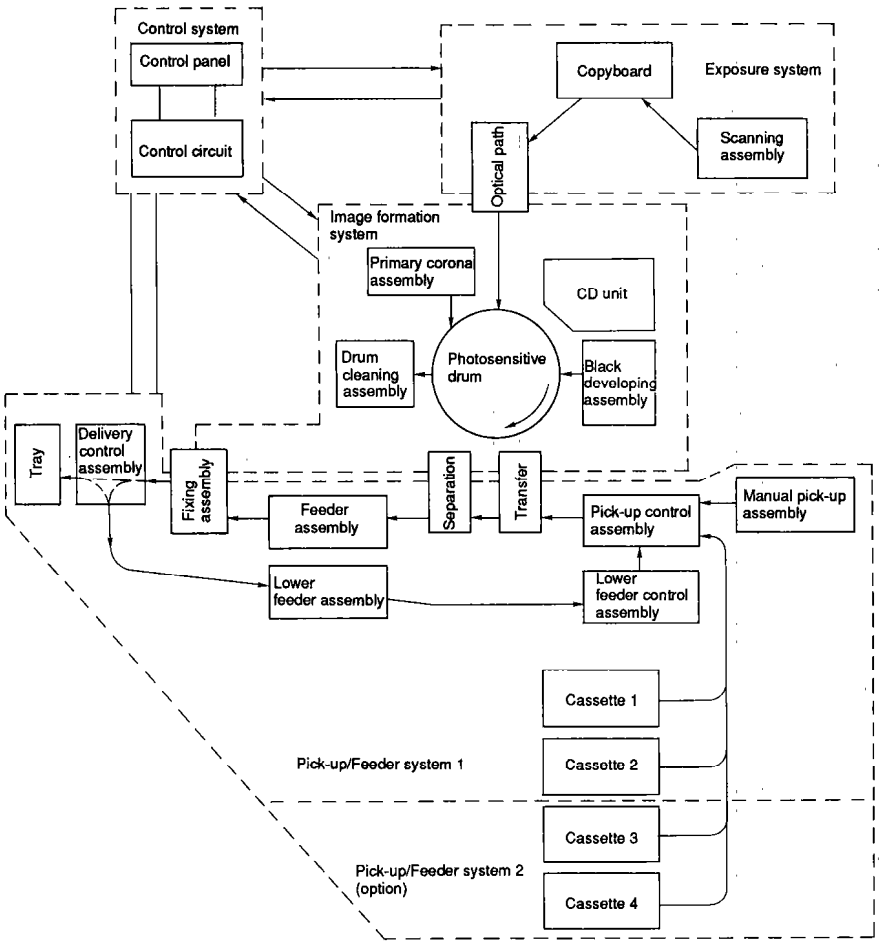

Figure 3-1

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B. Electrical Circuitry

The copier is controlled by the two microprocessors and five LSIs on its DC controller PCB; the main functions of each of these ICs are as follows:

Microprocessors

Q197 (main CPU)
- Controls the copying sequence

Q172 (sub CPU)
- Controls the stepping motor
- Reads analog signals

LSIs

Q141 (D/A converter)
- Generates image formation control signal

Q189 (LCDC)
- Controls the LCD control panel

Q169 (IPC)
- Controls RDF and sorter communication

Q190 (calendar IC)
- Controls the calendar

Q186 (gate array)
- Controls the CPU bus
- Turns elements ON/OFF
- Dual port RAM

The gate array (Q186) connected to the main CPU (Q197) and sub CPU (Q192) has a built-in dual port RAM that can read from or write to the main CPU and sub CPU.

The calendar IC (Q190) and RAM (Q179) are backed up by a lithium battery (BAT101).

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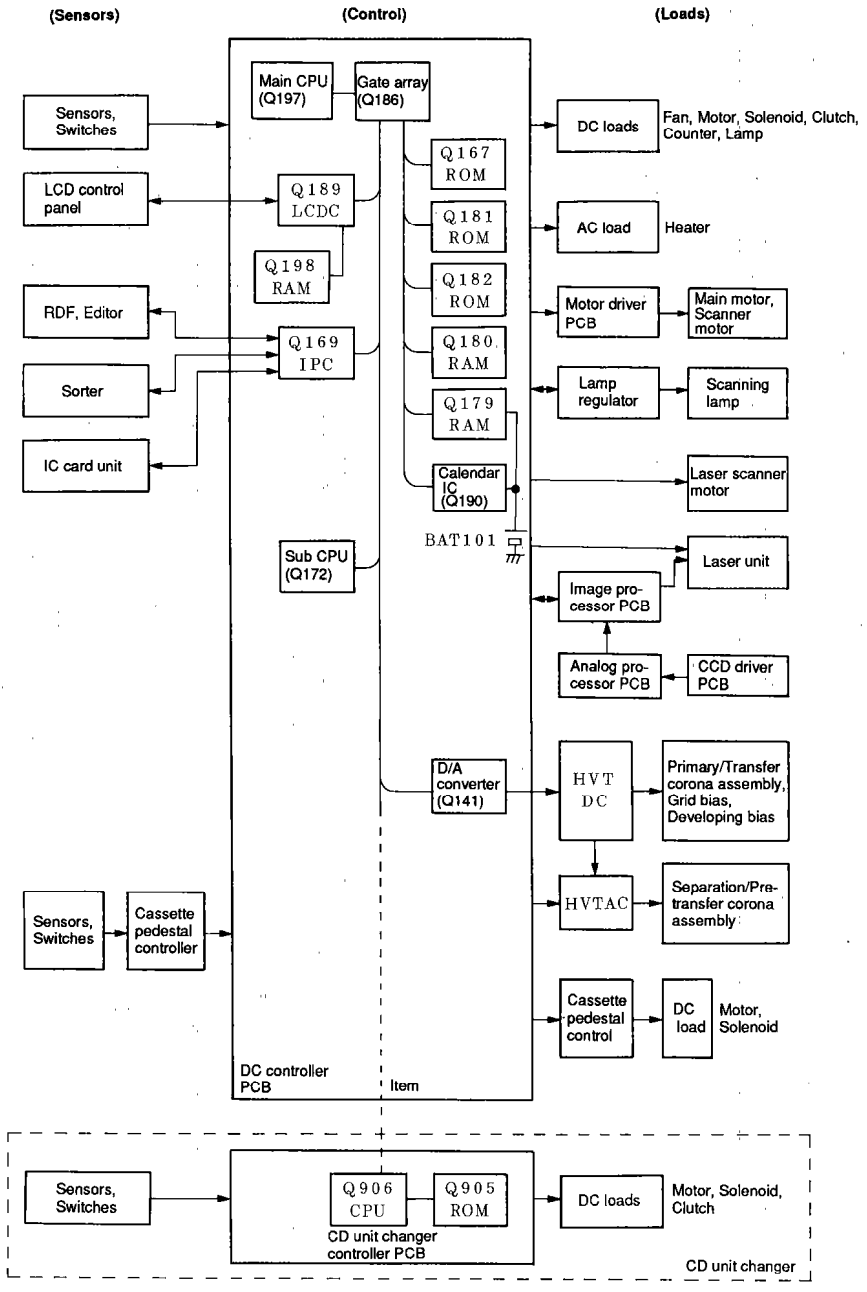

Figure 3-2

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C. Inputs to DC Controller

1. Inputs to DC Controller (1/3)

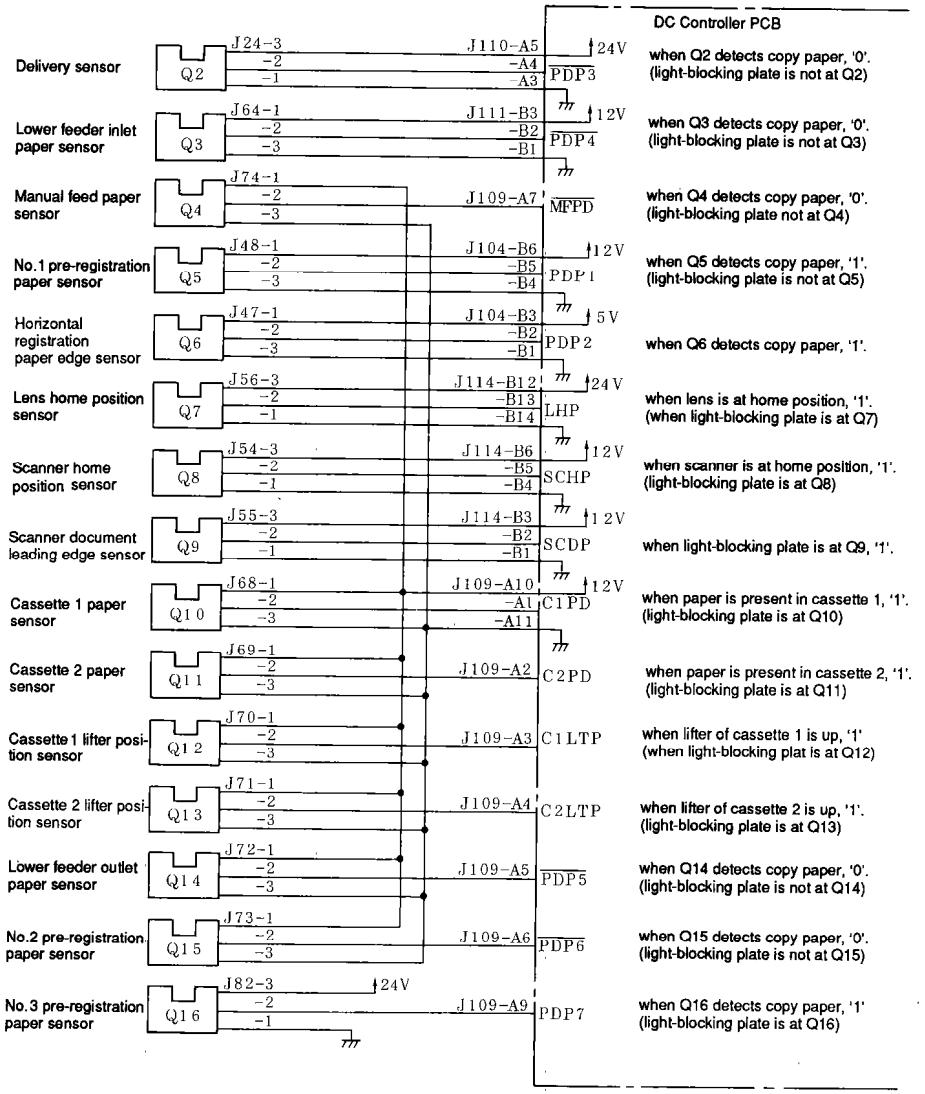

Figure 3-3

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2. Inputs to DC Controller (2/3)

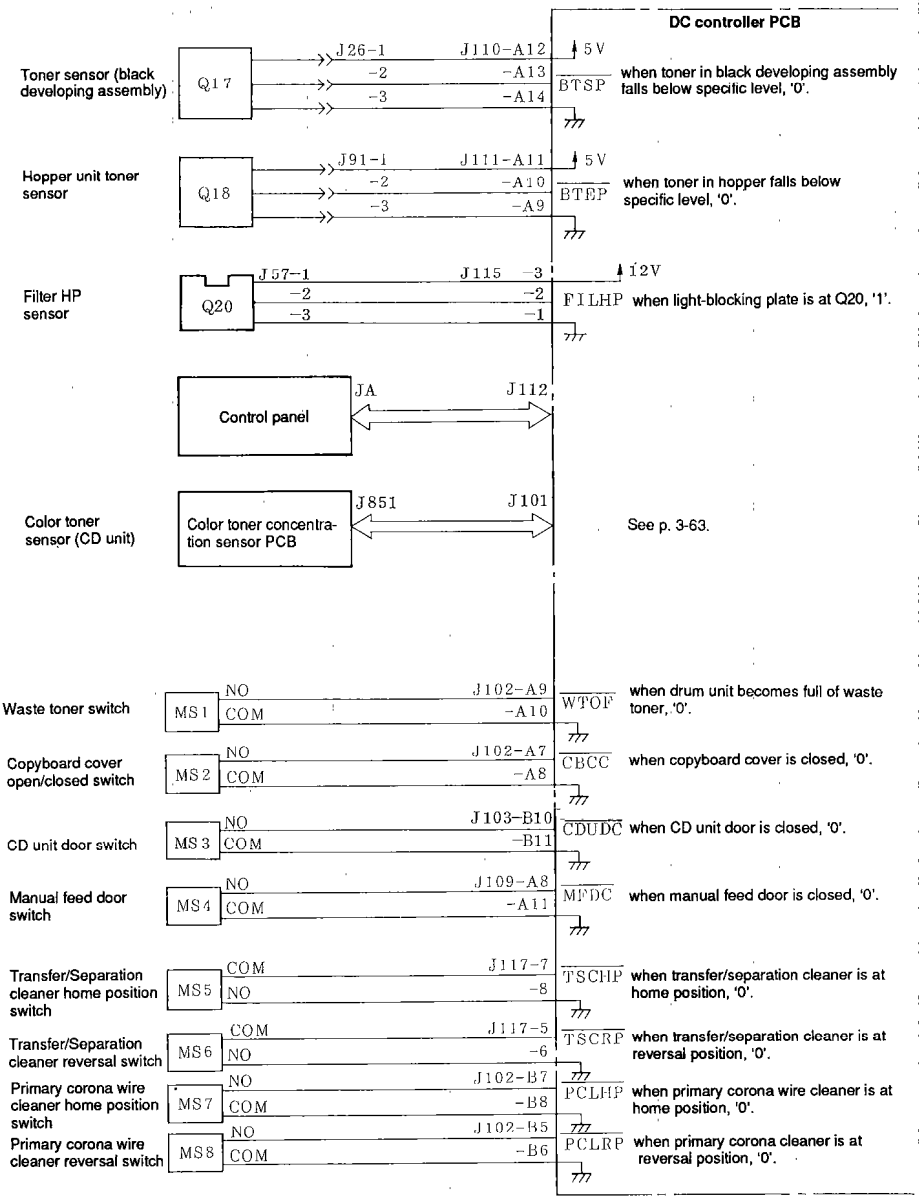

Figure 3-4

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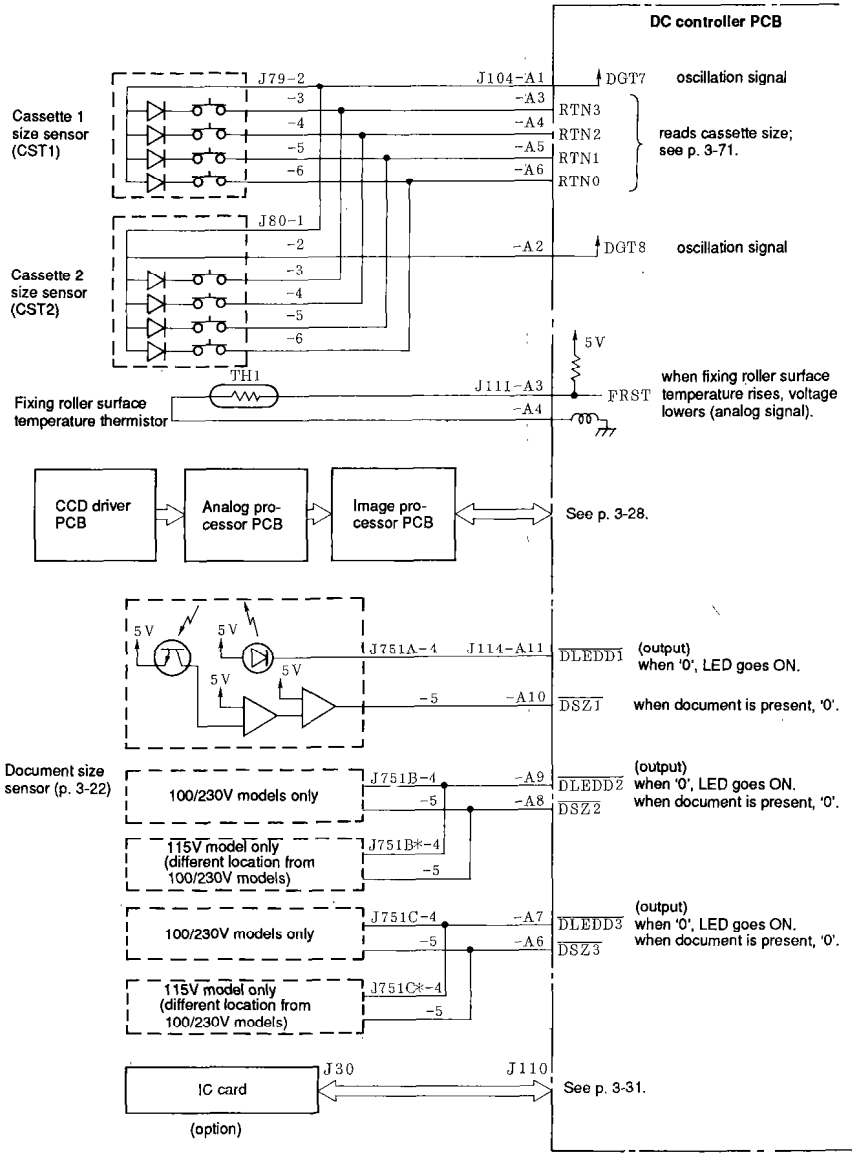
3. Inputs to DC Controller (3/3)



ABC refers to metric; AB* or C*, to inch.

Figure 3-5

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4. Inputs to DC Controller (cassette feeding unit)

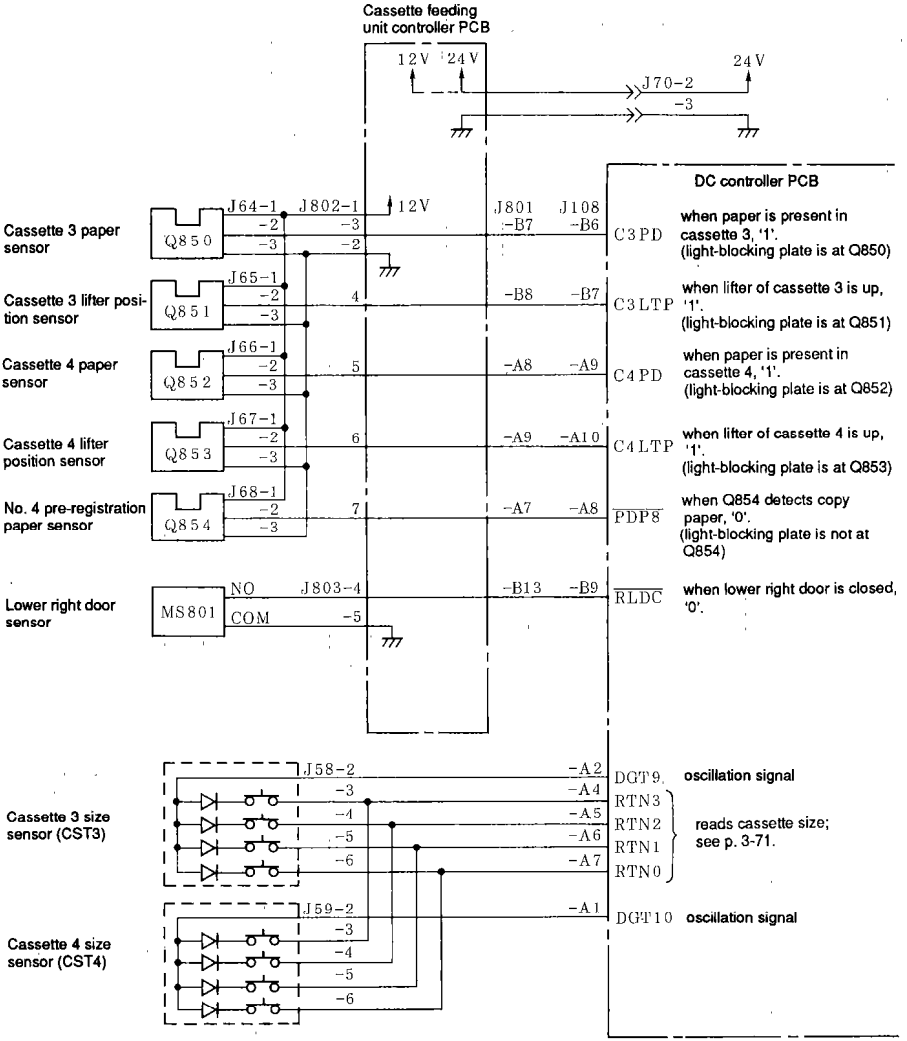

Figure 3-6

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D. Outputs from DC Controller

1. Outputs from DC Controller (1/4)

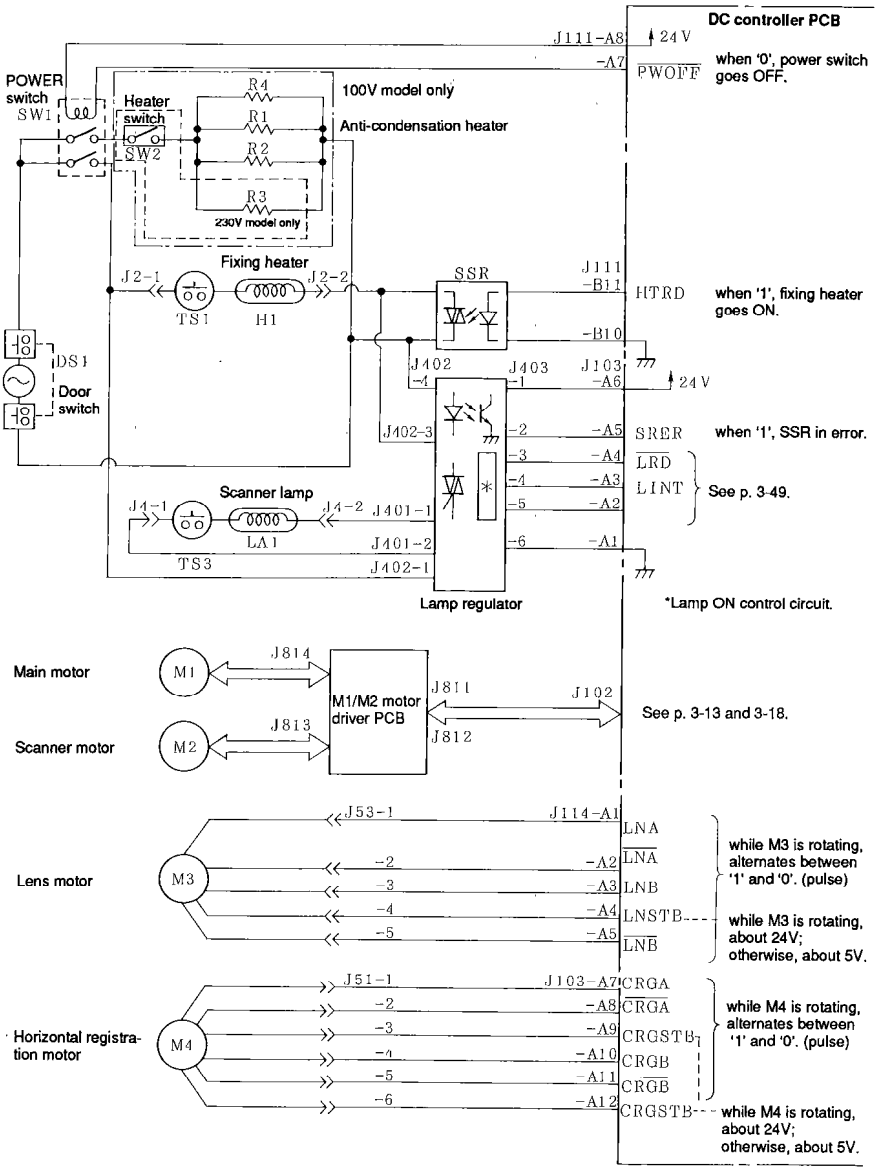

Figure 3-7

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2. Outputs from DC Controller (2/4)

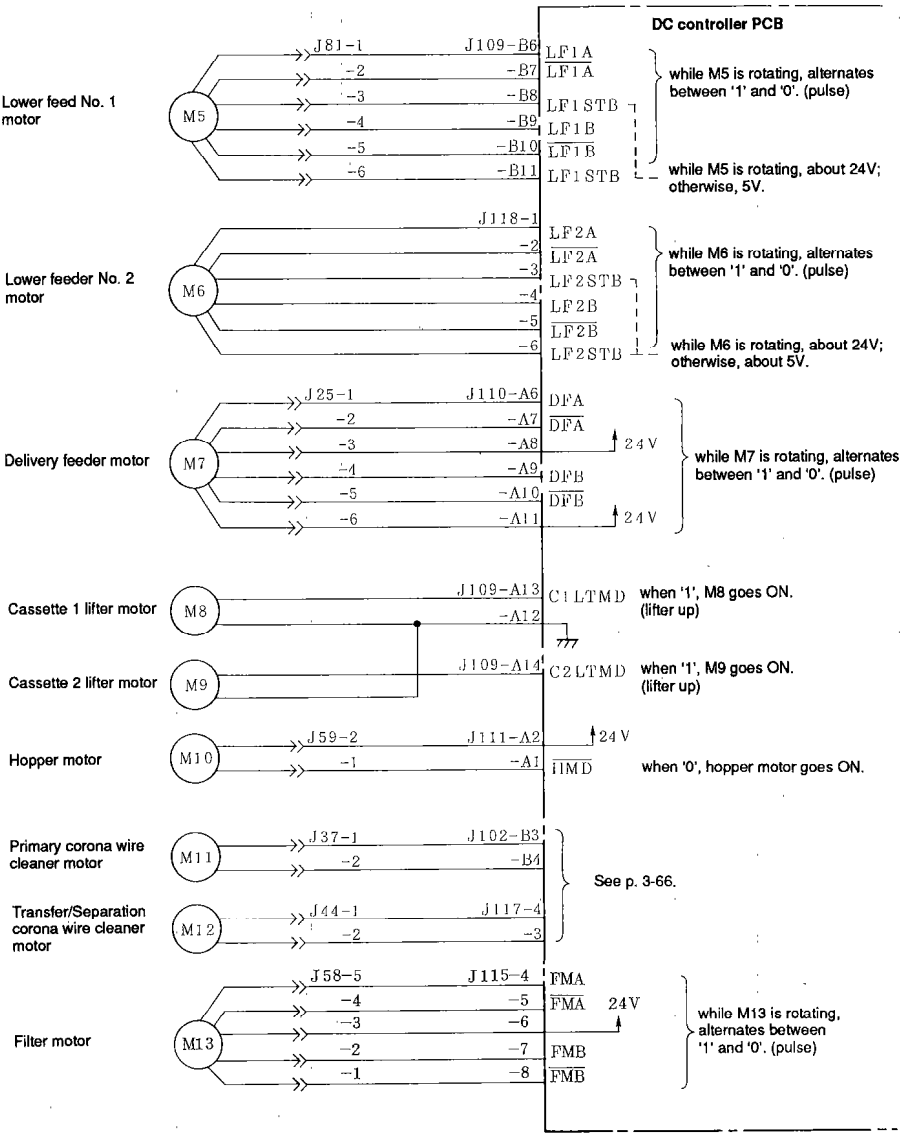

Figure 3-8

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3. Outputs from DC Controller (3/4)

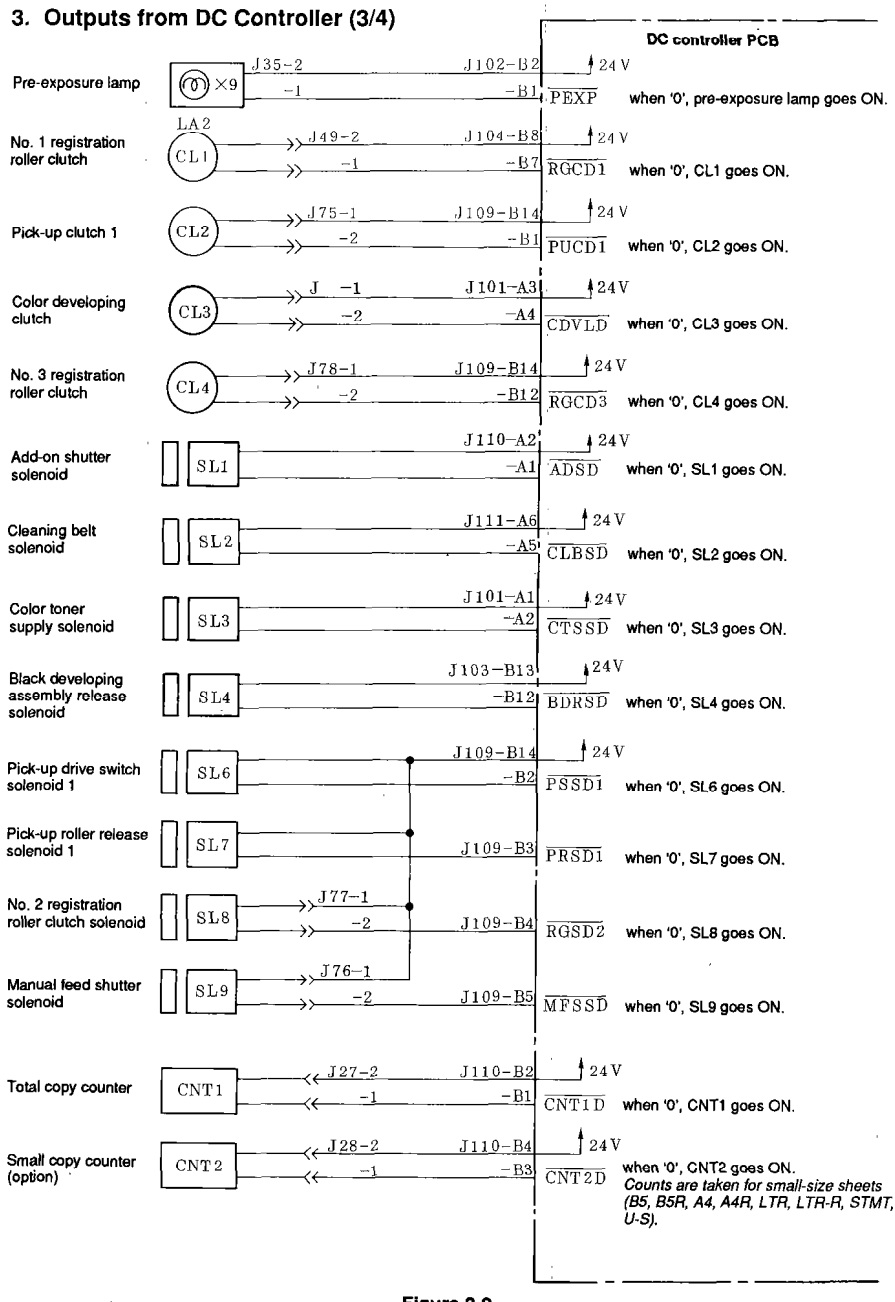

Figure 3-9

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4. Outputs from DC Controller (4/4)

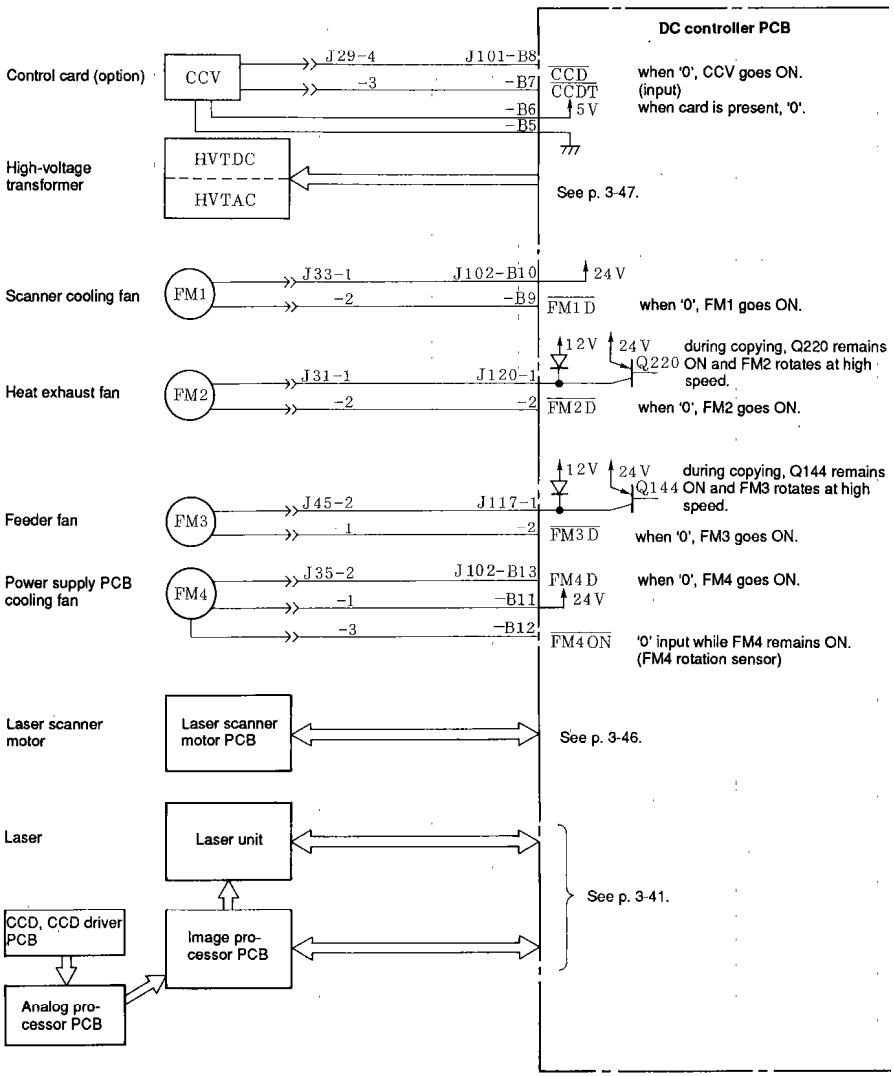

Figure 3-10

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5. Outputs from DC Controller (cassette feeding unit)

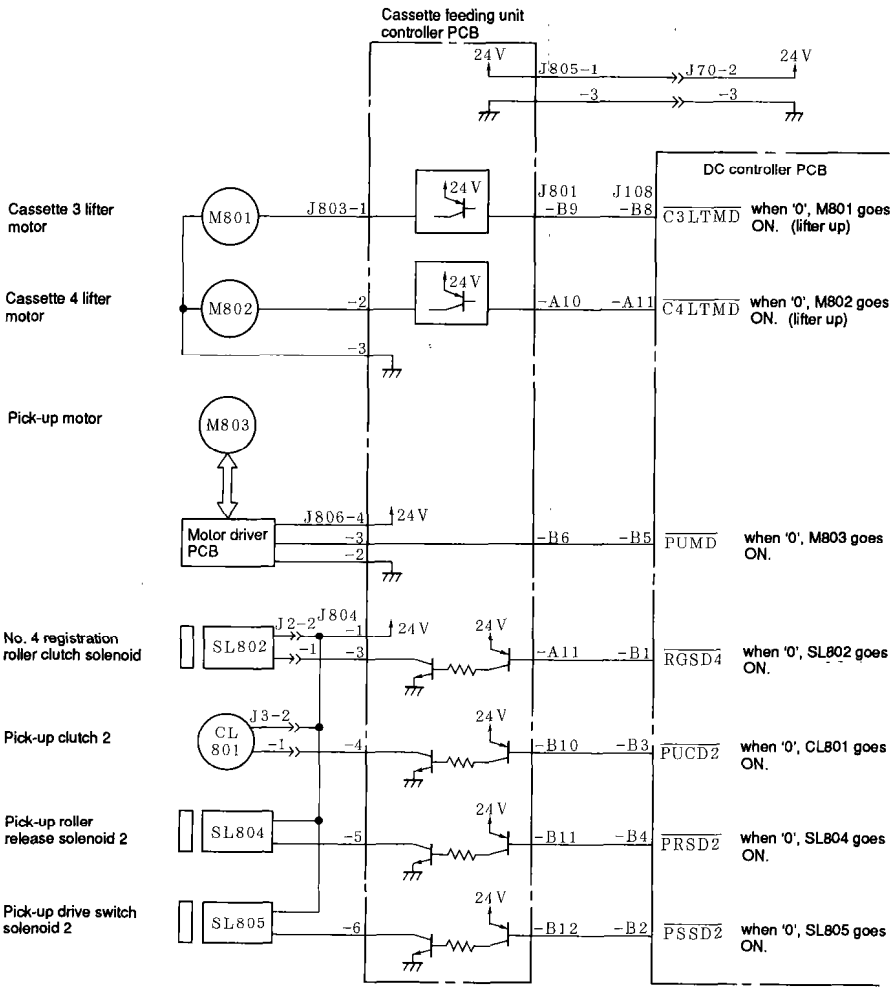

Figure 3-11

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E. Main Motor Control Circuit

1. Outline

Figure 3-12 shows the circuit that controls the main motor (M1), and the circuit has the following functions:

① Turns the main motor ON and OFF.

② Controls the main motor at constant speed.

The main motor (M1) is a DC motor with a built-in clock pulse generator. When the motor rotates, clock pulses (MMCLK) suited to the revolution of the motor are generated. The speed control circuit controls the motor speed using these clock pulses.

2. Mechanism

When the main motor drive command ($\overline{MMD}$) from the DC controller PCB goes '0', the drive circuit of the motor driver goes ON, thereby rotating the main motor.

The DC controller circuit monitors the main motor for an error by checking the PLL lock signal ($\overline{M1LK}$).

If the PLL lock signal ($\overline{M1LK}$) remains '1' for more than a specific period of time, 'E010' will be indicated on the control panel.

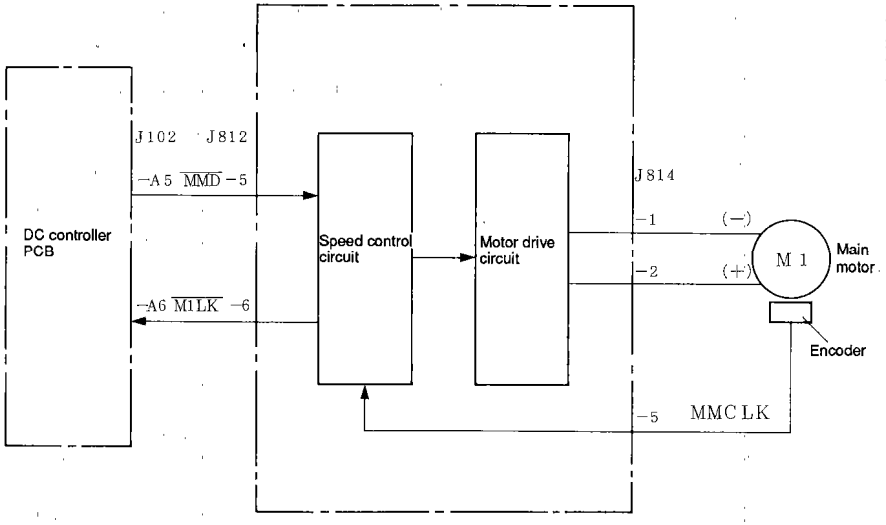

Figure 3-12

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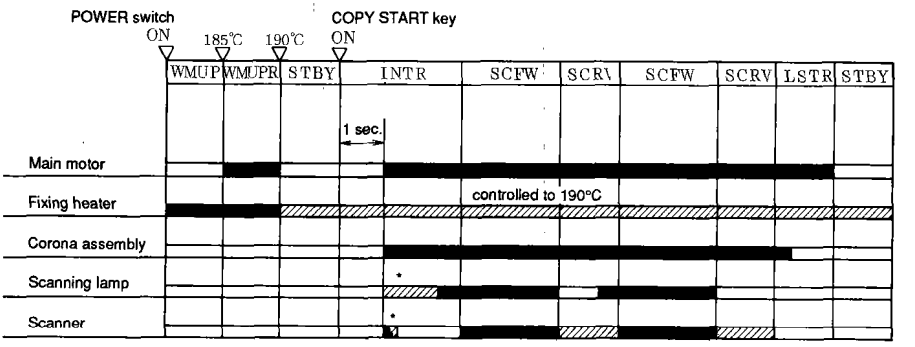
F. Sequence of Operations



* The lamp goes ON and the scanner moves forward/in reverse only for AE or shading correction.

Figure 3-13

Period		Description	Remarks
WMUP (warm-up)	From when the copier is switched ON to when the temperature of the fixing roller reaches 185°C.	Waits until the fixing roller warms.	The warm-up time varies depending on the temperature of the fixing roller; a press on the COPY START key activates the automatic copy start mode.
WMUPR (warm-up rotation)	From when the temperature of the fixing roller has reached 185°C to when it reaches 190°C; 6 sec at least.	Evens out the temperature of the fixing roller.	Upon completion of WMUPR, the message on the display changes from 'WAIT' to "READY'. • If documents have been set and the COPY START key has been pressed, copying operation starts automatically as soon as WMUPR is over.

Table 3-1A

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Period		Description	Remarks
INTR (initial rotation)	For about 2.5 sec (min.) after the COPY START key is pressed.	Stabilizes the sensitivity of the drum in preparation for copying operation.	It takes about 1 sec before the revolution of the scanner motor stabilizes.
		if the color identification (black/red, red extraction, freehand) has been specified, the scanner is moved forward to the scanner document leading edge sensor for shading correction.	
		If AE is needed also, the scanner is moved back and forth about 30 mm to measure the density of the document.	
SCFW (scanner forward)	While the scanner is moving forward. • The distance over which the scanner moves forward depends on the size of the cassette and the reproduction ratio selected. • The speed at which the scanner moves forward depends on the reproduction ratio selected.	The scanning lamp exposes the document, and the optical image is directed to the photosensitive drum.	The registration signal is generated to move the copy paper to the transfer assembly.
SCRV (scanner reverse)	While the scanner is moving in reverse.	Returns the scanner to the home position in preparation for the next copy run.	
LSTR (last rotation)	From when SCRV is over until the copy paper moves past the delivery sensor.	Cleans the surface of the drum electrostatically.	Discharges the last copy.
STBY (standby)	From when LSTR is over until the COPY START key is pressed or the copier is switched OFF.	Waits for a press on the COPY START key or other operation keys.	• The indication on the control panel returns to the standard mode 2 min after LSTR.

Table 3-1B

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II. EXPOSURE SYSTEM

A. Varying the Reproduction Ratio

The reproduction ratio across the drum (axial) is varied by the lens drive system; that around the drum (circumferential) is varied by the scanner drive system.

The lens drive system consists of a zoom lens which is moved back and forth to change the focal distance, thereby varying the reproduction ratio across the drum.

The scanner drive system changes the speed of the movement of the No. 1 mirror to vary the reproduction ratio around the drum; faster than the drum speed for reduction, and slower for enlargement.

Note:
In the DIRECT mode, the speed of the No. 1 mirror and the circumferential speed of the drum are the same.

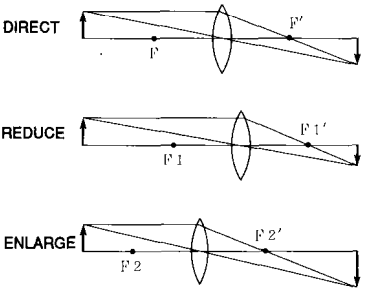

Figure 3-14

B. Lens Drive System

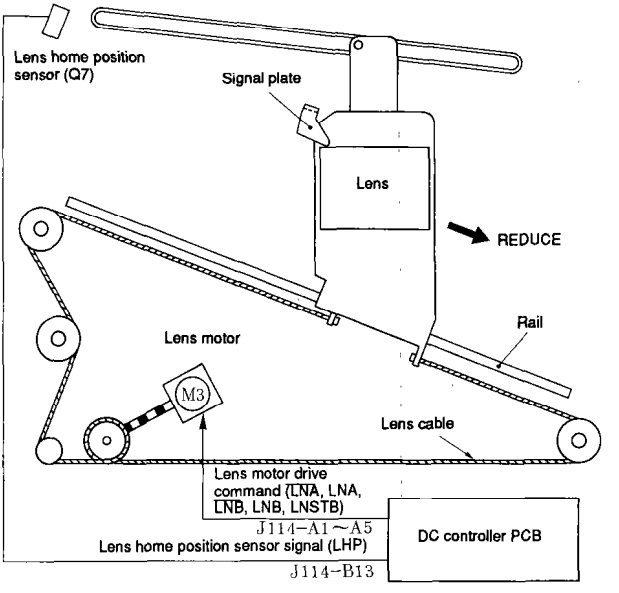

Figure 3-15

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1. Outline

The lens assembly is driven by the lens motor (M3).

When the machine is switched ON, the motor (M3) always rotates in reverse, thereby moving the lens to a point at which the signal plate blocks the home position sensor. When the lens reaches the home position, the motor starts to rotate forward, and the motor stops after the signal plate has left the sensor and a specific number of pulses have been generated; this will set the lens to the DIRECT position.

To move the lens in the ENLARGE direction (e.g., from REDUCE to ENLARGE), the motor is rotated in reverse first, moving the lens past the position for the selected reproduction ratio; thereafter, the motor is rotated forward, thereby moving the lens back to the position for the selected reproduction ratio. Stopping the lens with the motor rotating always forward ensures correct positioning of the lens.

2. Lens Motor Drive Circuit

The lens motor is a stepping motor and is rotated by the LNSTB signal and pulse signals ($\overline{\text{LNA}}$, LNA, $\overline{\text{LNB}}$, LNB).

When the lens motor is rotating, LNSTB is 24 V; the motor rotates when the above pulses are applied to each phase in sequence.

When the lens motor is at rest, LNSTB is 5 V; the motor is still provided with power so as to maintain the position of the lens.

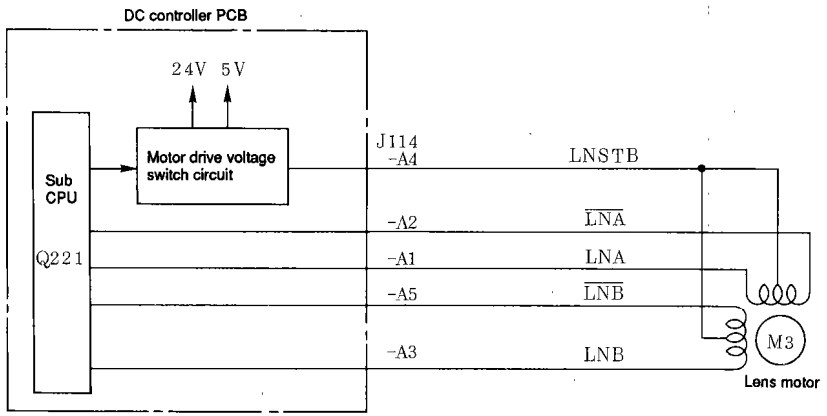

Figure 3-16

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C. Scanner Drive System

1. Outline

The scanner motor is a DC motor and is equipped with a built-in clock pulse generator.

The direction of its rotation is changed to move the scanner forward or in reverse; the speed of its rotation when moving the scanner forward is varied to suit the reproduction ratio.

The speed of its rotation when moving the scanner in reverse is constant and is maintained three times the forward speed at which the scanner is moved forward in the DIRECT mode.

The motor is braked when the signal plate reaches the photointerrupter (Q9) to stop the scanner at the home position.

The distance over which the scanner moves is varied to suit the size of copy paper and the selected reproduction ratio.

2. Mechanism

The motor driver circuit controls the direction and speed of the scanner motor based on the following signals generated by the microprocessor on the DC controller:

- scanner motor drive command (SCMD)
- scanner forward command (SCFW)
- scanner speed control command (SCCLK)

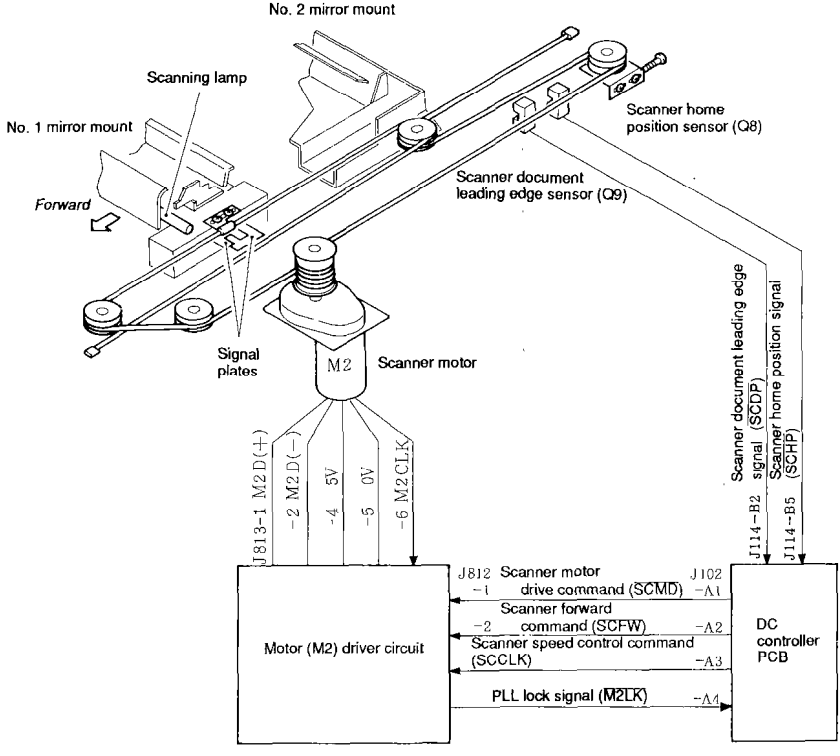

Figure 3-17

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	$\overline{SCMD}$	$\overline{SCFW}$
Forward	0	0
Reverse	0	1
Braking	0	*
Still	1	**

*'1' and '0' are reversed from previous state.
**'1' or '0' is maintained.

Table 3-2

The motor driver circuit operates as shown in *Table 3-2 based on the combinations of* $\overline{SCMD}$ and $\overline{SCFW}$.

When the scanner is moving forward, the number of SCCLK pulses is varied according to the reproduction ratio selected; when the scanner is moved in reverse, however, the number remains the same. The motor driver circuit compares the scanner motor clock pulse (M2CLK) against the number of SCCLK pulses and controls them so that they match.

The machine will indicate 'E203' if the PLL lock signal ($\overline{M2LK}$) remains '1' for more than a specific period of time.

3. Relationship between Scanner Sensors and Signals

Scanner sensor	Signal	Scanner		Description
		Forward	Reverse	
Q8	SCHP			The scanner is at the home position.
Q9	SCDP	1st		• Shading starts
		2nd		• 0.3 sec thereafter*, No. 1 registration roller clutch goes ON. • This serves as the reference for the forward movement of the scanner. • The CCD starts to read the image (ITOP).
			1st	• The scanner stops moving in reverse. • About 2.5 msec thereafter*, the scanner is braked.

*May be varied in the service mode.

Table 3-3

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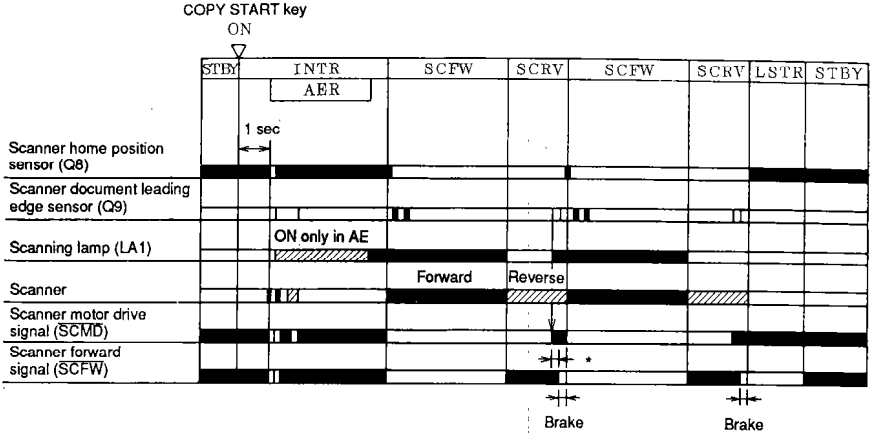
4. Sequence of Operations (scanner)

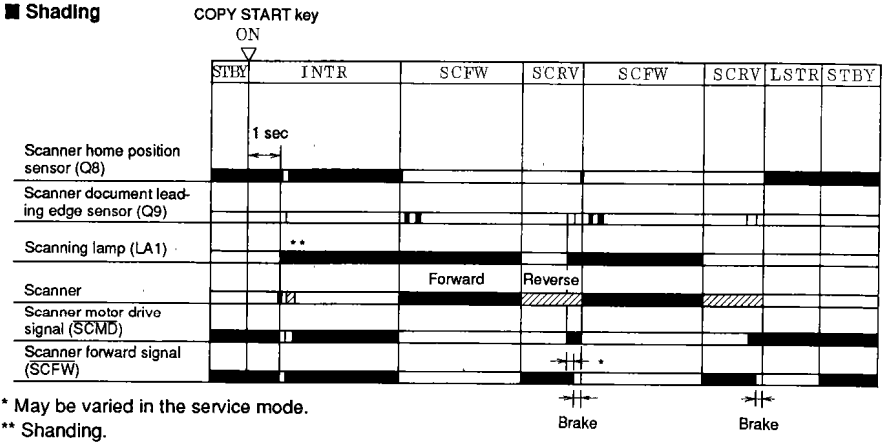
■ AE ON



* May be varied in the service mode.

Figure 3-18

■ Shading



* May be varied in the service mode.
** Shanding.

Figure 3-19

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5. Sequence of Operations (two-page separation)

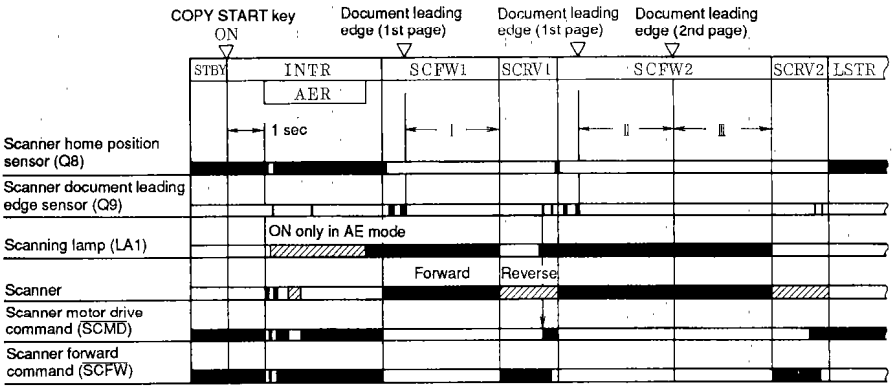

Figure 3-20

I, II, and III shown in Figure 3-20 are controlled by the microprocessor on the DC controller PCB based on the scanner document leading edge (rising edge of SCDP) for the first page.

The microprocessor determines the distance over which the scanner should move based on the size of the document or the size of the selected cassette.

I, II: The distance over which the scanner moves is determined by the reproduction ratio selected and the size of the document or the size of the cassette.

III: When the size of the document is identified, the microprocessor divides the measurement by 2 and assumes the result of division to be the center of the document.
The scanner is moved assuming the result to be the leading edge of the document.
If continuous copying is executed without identifying the size of the document, the size of the cassette will be used as reference for control.
If II in Figure 3-20 exceeds about 216 mm, 216 mm (approx.) will be assumed to be the leading edge of the second page.

If the sequence of copying the first and second pages is changed in the asterisk mode, the mechanism remains the same but with the sequence of SCFW2/SCRV2 and SCFW1/SCRV1 reversed.

Note:
If two or more modes are selected, the scanner is controlled based on the minimum measurement of the document.
The microprocessor uses the document size only when the modes in Table 3-4 are selected.

Mode	Document size (reference)
FEEDER (with RDF in use)	document size identified by feeder; the identified size may be checked in the service mode (DF-SIZE; * 1 *).
DOCUMENT FRAME ERASE and BOOK FRAME ERASE	document size specified by user.
AUTO REPRO or AUTO PAPER SELECT	document size identified by copier

Table 3-4

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D. Controlling the Document Size Identification

1. Outline

The machine is equipped with auto paper selection and auto reproduction ratio selection mechanisms, which requires identification of the size of the document.

Figure 3-21 shows the three document sensor circuits attached under the copyboard glass. When the copyboard cover is brought down, the outputs of the document sensor circuits are checked, and the measurements are used to identify the size of the document as being A3, B4, A4, or B5 (standard sizes).

These document sensor circuits cause LEDs to emit light against the document, and the reflected light is monitored by phototransistors, whose outputs are sent to the DC controller.

2. Mechanism

When the copyboard cover is brought down to about 30 degrees, the microswitch (MS2) attached to the rear of the machine goes ON.

For a period of 15 sec after MS2 has gone ON or until the COPY START key is pressed, the output of each sensor is read at intervals of 0.1 sec. If no change takes place in the level during the period, i.e., if the sensors do not go ON or OFF, a document is assumed to exist over each respective sensor. The size of the document is then identified based on the combinations shown in Table 3-5.

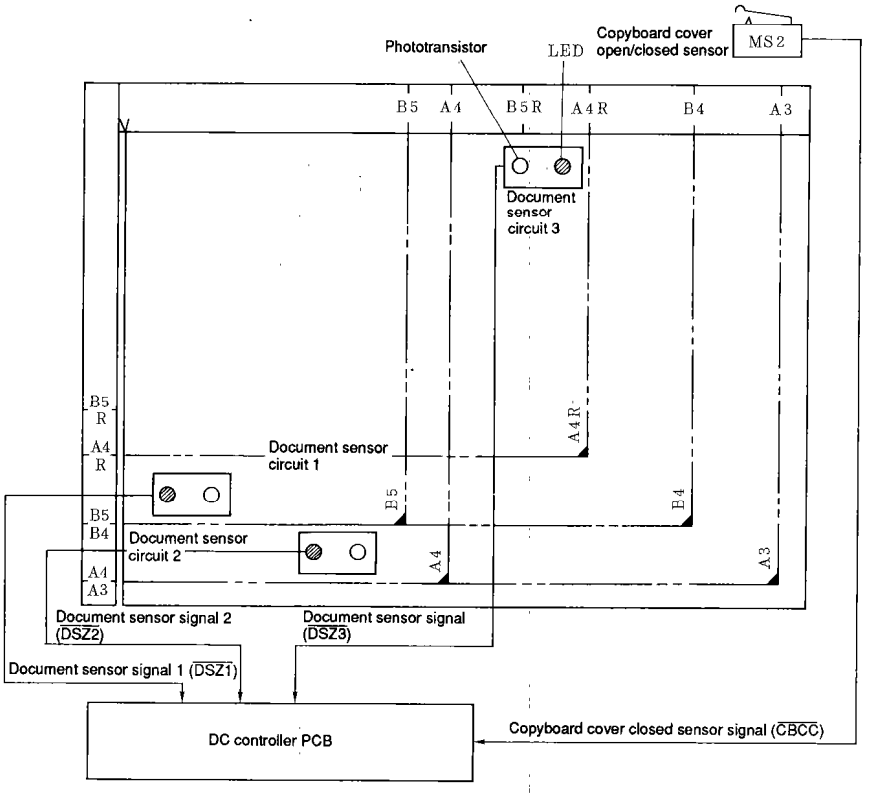

Figure 3-21 (100/230 V models)

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The mechanism found below ensures identification of sizes even if the density of the documents is appreciably high.

In this mechanism, however, the output levels of the sensors will not vary under conditions a and b below; to compensate for this, if any one of the output levels of the three sensors does not change when MS2 goes ON, the levels of the sensors are compared against the slice level to identify the size of the document.

In the case of c, A3/11"×7" will be selected automatically; if a suitable cassette is not available, the cassette specified in the standard mode will be selected.

a. bark document of A3/11"×17"
b. book document (thickness makes the changes in sensor levels too small for detection)
c. copyboard cover not closed (MS2 OFF)

Note:
Conditions give above, i.e., a, b, and c, make correct identification of the document size difficult.

3. Identifying the Document Size

The DC controller PCB identifies the size of the document based on combinations of signal states as shown in Table 3-5.

No.	Document size	Document sensors		
		1	2	3
1	A3	ON	ON	ON
2	B4	ON	OFF	ON
3	A4	ON	ON	OFF
4	B5	ON	OFF	OFF
5	A4R	OFF	OFF	ON
6	B5R	OFF	OFF	OFF

ON: indicates a document is present.
OFF: indicates no document is present.

Table 3-5

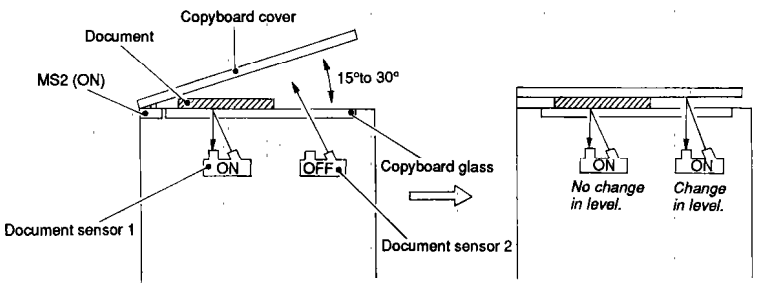

Figure 3-22 Identifying the Size of Documents

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E. Switching Filters

1. Outline

Normally, the copier puts the C-filter into the optical path for red correction. In the automatic color reproduction, color edit, or freehand mode, however, the copier switches filters to control the light reflected by the document to suit each mode.

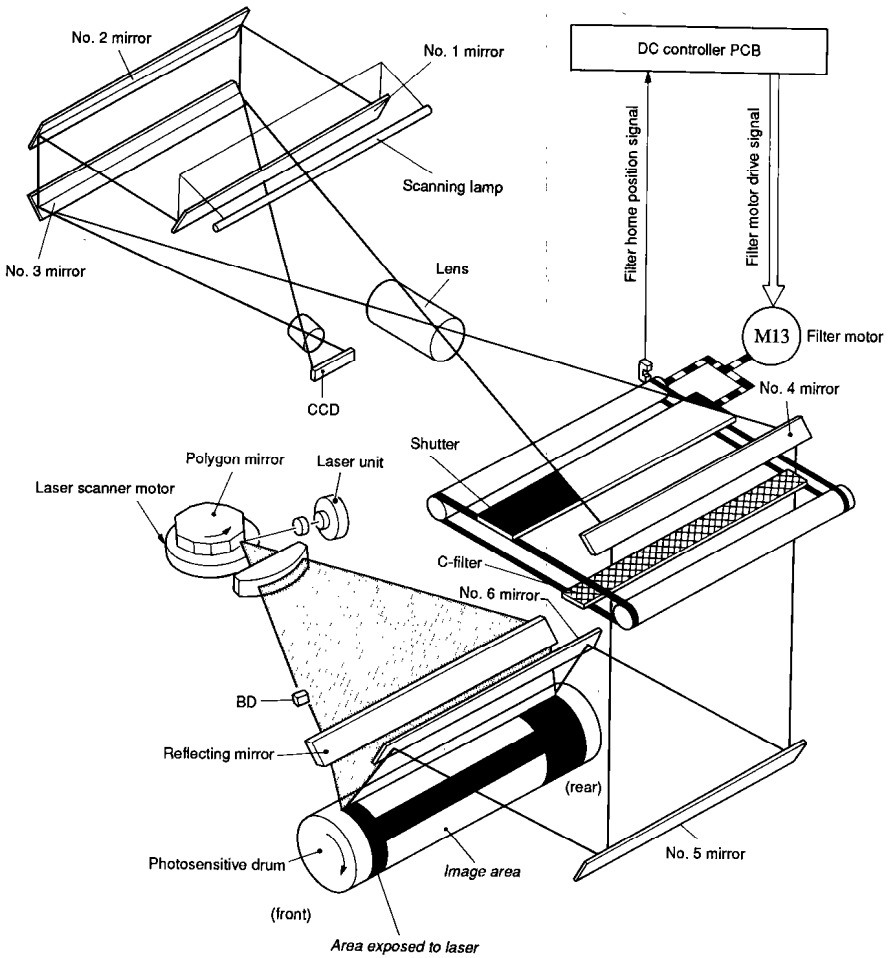

Figure 3-23

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2. Switching the Filters

The filter switch assembly consists of the C-filter, R-filter, and shutter; they are switched as described in Table 3-6.

Filter	Description
C-filter (cyan)	used for normal copying operation to improve red reproduction.
R-filter (red)	used to eliminate red areas on the document; such areas are identified by the CCD.
Shutter	used to block out the reflected light of the scanning lamp.

Table 3-6

The filter change assembly is driven by the filter motor (M13).

When the copier is switched ON, the motor first rotates in reverse to move the belt until the signal plate blocks the filter home position sensor (Q20) and stops, thereby positioning the C-filter in the optical path.

When the R-filter or the shutter is selected, the filter motor is rotated forward to move the filter to its position.

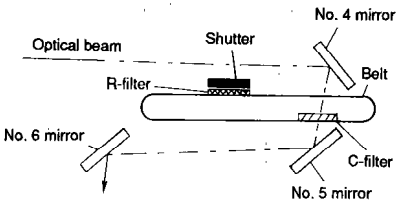

Figure 3-24 A (C-filter in use)

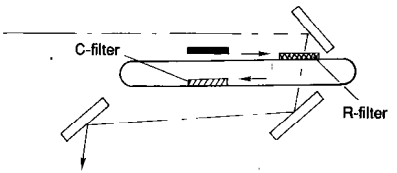

Figure 3-24 B (R-filter in use)

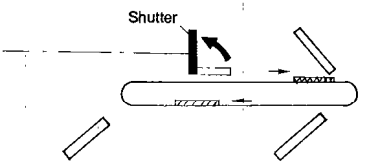

Figure 3-24 C (shutter in use)

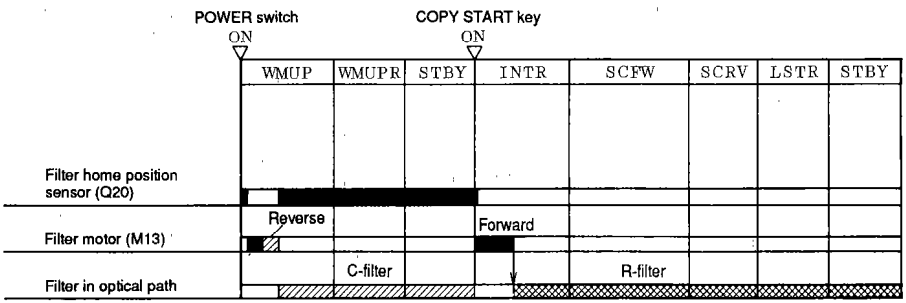

Figure 3-25

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The filters are switched to suite the selected mode as shown in Table 3-7.

Key	Sub mode	Overlay copy	Filter/CCD	Document	Light source	Remarks
AUTO COLOR REPRO-DUCE	Black/Red document	1st	R	black	Scanning lamp	
		2nd	shutter+CCD	red	laser	Eliminates non-red area by laser.
COLOR EDIT	Red elimi-nate	1st	R	black	Scanning lamp	Eliminates red area by R-filter.
	Red ex-tract	1st	shutter+CCD	red	laser	Eliminates non-red area by laser.
FREE-HAND	Color con-version	1st	R	black	scanning lamp	Eliminates area inside marker by laser.
			CCD	area inside	laser	
		2nd	R	black	Scanning lamp	Eliminates area out-side marker by laser and subjects it to color conversion.
			CCD	area outside	Laser	
	Framing	1st	R	black	scanning lamp	Eliminates area out-side marker by laser.
			CCD	area inside	laser	
	Blanking	1st	R	black	scanning lamp	Eliminates area inside marker by laser.
			CCD	area inside	laser	
	Highlight	1st	R	black	scanning lamp	
		2nd	shutter+CCD	area inside	laser	Shades area within marker.
	Negative	1st	R	black	scanning lamp	Eliminates area inside marker by laser.
			CCD	area inside	laser	
		2nd	shutter+CCD	area inside	laser	reverses (positive to negative) area inside marker by laser; area outside marker is eliminated by laser.

Table 3-7

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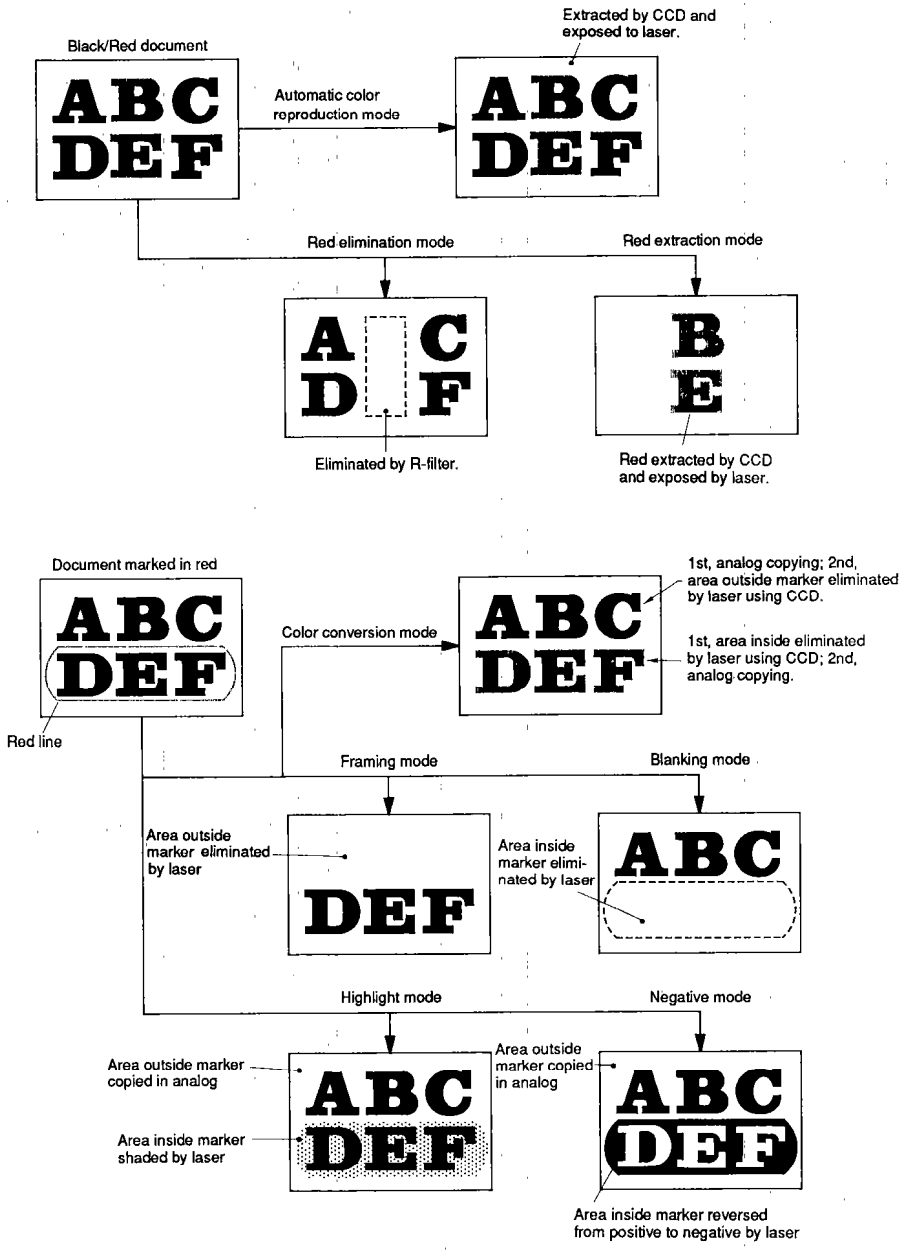

Figure 3-26

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III. IMAGE PROCESSING/LASER EXPOSURE SYSTEM

A. Outline

The NP-4080 is an analog copier, but it is equipped with an image processing system and a laser exposure system to enable the following modes:

- blank exposure (for REDUCE, between sheets, leading edge margin)
- framing, blanking, binding, frame erasing
- add-on (date, headline, numbering, character, stamp)
- screen
- highlight
- marker
- laser exposure for image read by CCD

The image processing system consists of the CCD, CCD driver PCB, analog processor PCB, and image processor PCB; it converts optical images generated by the document exposure system into electrical signals and, after correction and processing, sends them to the laser exposure system.

The laser exposure system consists of the laser assembly, laser driver PCB, scanner with a polygon mirror, lens, and filter switching assembly.

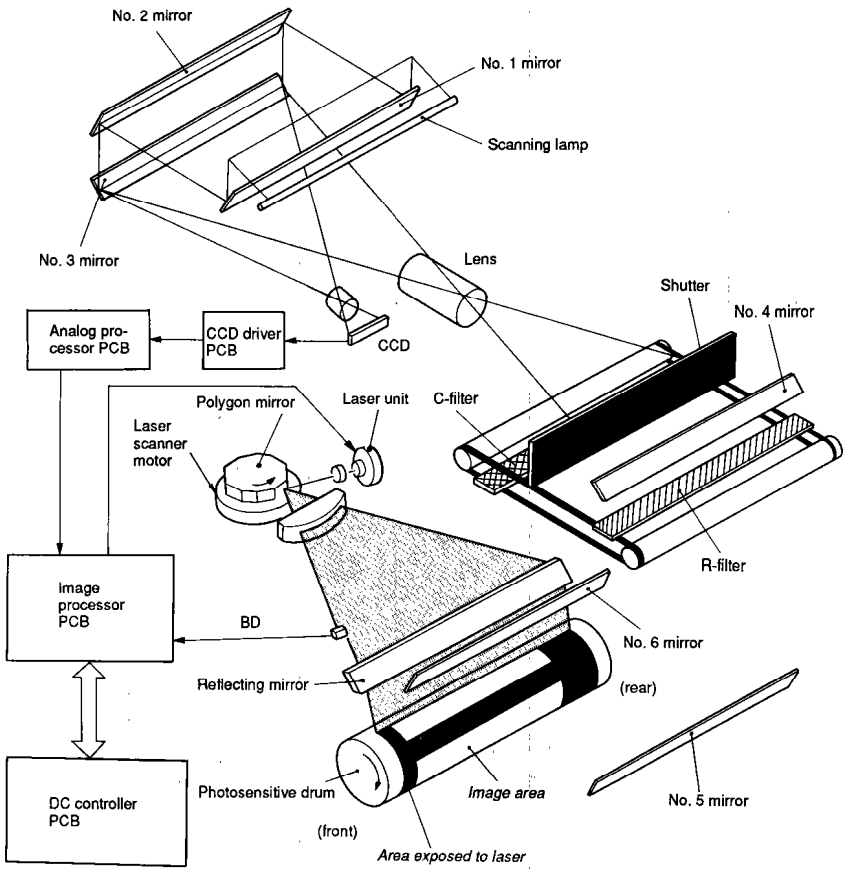

Figure 3-27

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B. Controlling the CCD/CCD Driver

The CCD (charge-coupled device) used in the copier is made up of about 5000 light-receiving cells and consists of a light-receiving unit, transfer unit, and output unit. The light-receiving unit is constructed as a single entity with the C- and R-filters, each pair of adjacent C- and R-filters reading an image equivalent of a single pixel.

Each light-receiving cell is 5 × 7 µm.

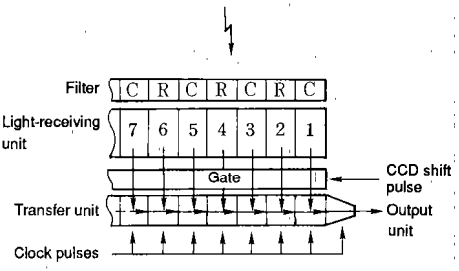

Figure 3-28

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C. Analog Image Processing

The analog processor circuit processes the output signals from the CCD for the following:

- level matching (C and R signals)
- A/D conversion

The image signals received by the analog processor circuit is sample-held by the sample hold signal (SH) and divided into C-signals and R-signals as determined by the select signal (SEL).

The CR levels are then matched according to the C/R gain signal and the C/R offset signal to compensate for the variations in the photo conversion characteristics of each C and R CCDs.

The C signals and R signals are then synthesized and converted into 6-bit digital signals as timed by the A/D clock signal (ADCLK) for output to the image processor PCB.

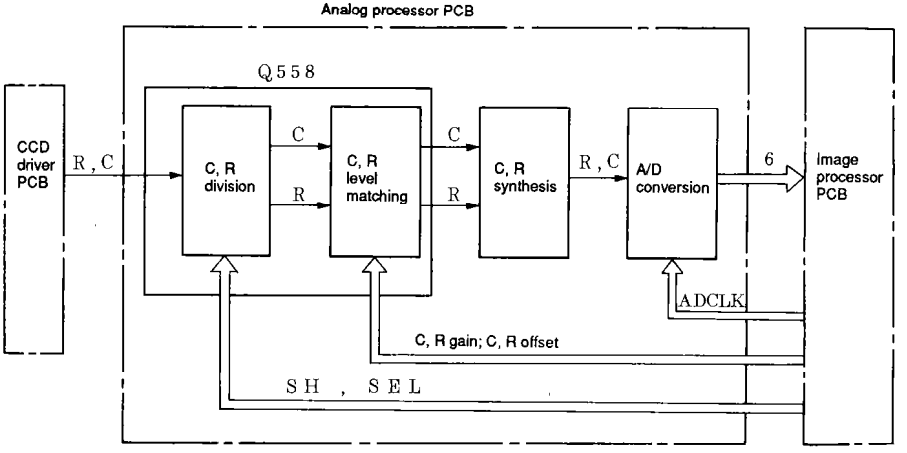

Figure 3-29

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D. Digital Image Processing

1. Outline

The circuit is organized as shown in Figure 3-30. The image signals coming from the analog image processing unit are processed for red extraction and freehand identification by the digital processing unit.

After the processing below, the video data are turned into binary values and sent to the laser driver PCB as image signals.

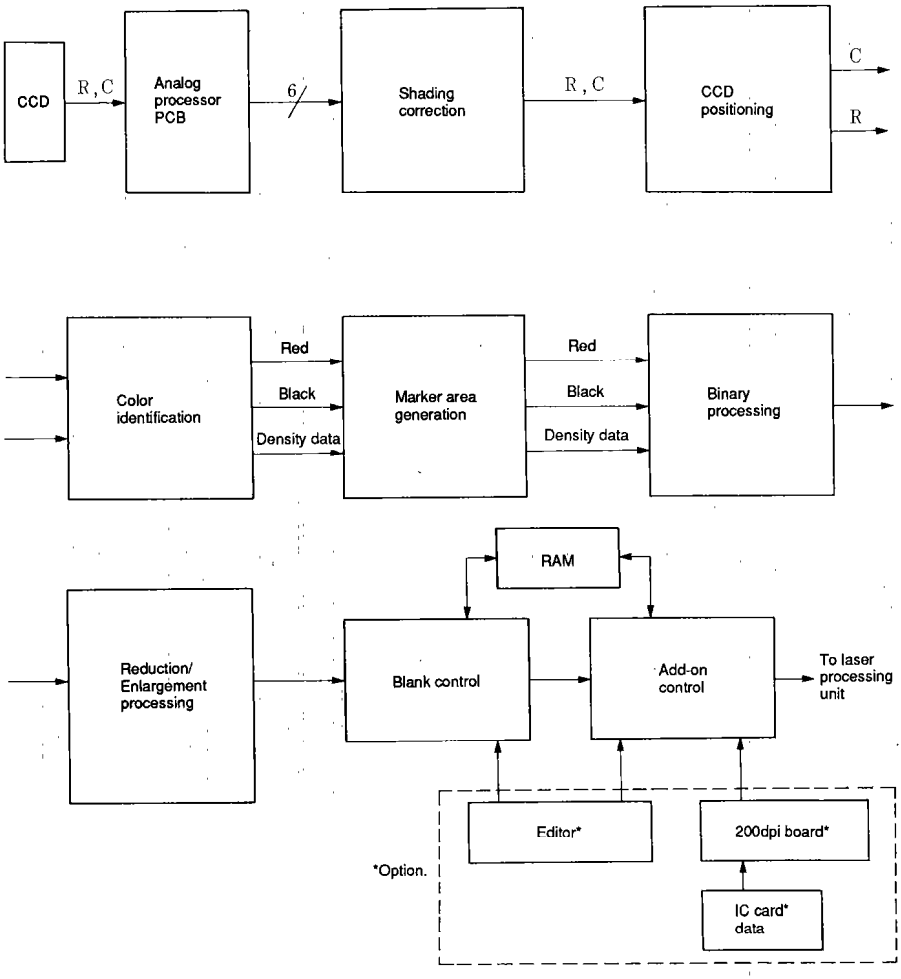

Figure 3-30

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2. Shading Correction

The output from the CCDs may not be even. It represents light reflected by a document with uniform density for the following reasons:

a. The sensitivity varies from pixel to pixel.
b. The infiltration characteristic of the lens differs between center and periphery.
c. The scanning lamp deteriorates over use.

To compensate the above, shading correction is executed.

During shading correction, the scanning lamp remains ON to expose the standard white plate.

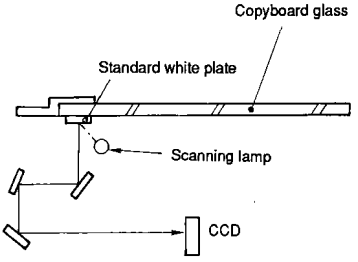

Figure 3-31

The CCD measures the light reflected by the standard white plate and outputs the data.

The shading correction circuit compares the measurements and the target value of the standard white plate and stores the difference as the shading correction value.

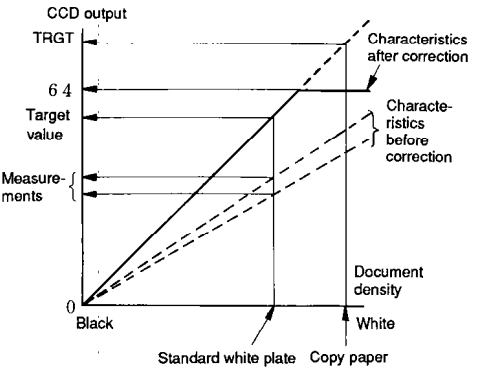

Figure 3-32 Shading Correction

The shading correction value is used to ensure that the data obtained when the document is scanned will be uniform; measurements are taken each time an applicable mode is selected the COPY START key is pressed.

Note:
Note that, in 'CCD_LAMP' in service mode, the standard white plate is set to a density level identical to the white level of a document; however, they do not necessarily match.
For this reason, when 'CCD-LAMP' is executed in service mode, the machine reads the density of white paper, and the measurement is corrected in relation to the density level of the standard white plate, thereby determining the document white level for copying operation.
Place several sheets of white paper on the copyboard glass when executing 'CCD-LAMP'.

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3. CCD Output Processing

The CCD is alternately covered by C- and R-filters, so that the outputs of the CCD also alternates between C and R.

The C and R image data are divided to C and R outputs and stored in the form of C and R image data each representing continuous data in the main scanning direction.

Since the 5000 pixels of data from the CCD is divided by two, each channel has data representing 2500 pixels.

The 2500-pixel data are doubled to obtain 5000-pixel data by computation.

4. Color Identification (object pixel)

As shown, the object pixel is identified for its color (red, black) using the C image data and R image data.

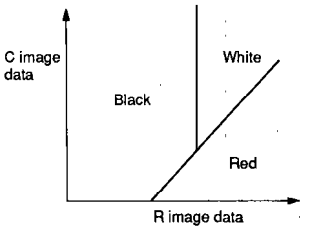

Figure 3-34 Color Identification of Pixel

Note:

Adjusting the Red Identification Reference

You can adjust the red identification reference for documents in service mode as follows:

RED_THICK: red extraction mode, red extraction in black/red document mode, and negative copying in marker mode

RED_THICK + MKR_TH: marker mode

When you have replaced the CCD unit or the analog processor PCB, the level of the red signal from the unit or the PCB changes, causing incorrect identification of red. If such a problem is noted, make adjustments in 'RED_THICK' and 'MKR_TH'.

However, although increasing the setting for 'RED_THICK' or 'MKR_TH' eliminates incorrect red detection, fine red lines may not be correctly reproduced.

On the other hand, decreasing the settings can cause the machine to identify white or black areas as being red.

For marker mode, in particular, incorrect red identification can occur if the setting for 'MKR_TH' is not correct and, as a result, areas specified by the user may not be detected at all.

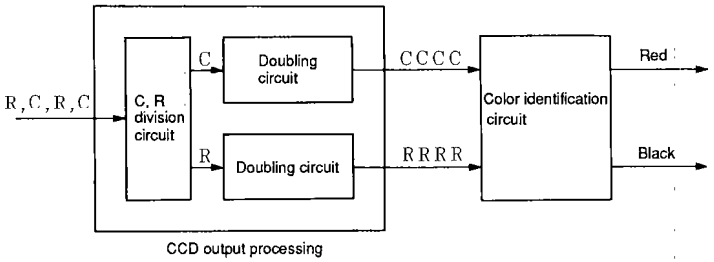

Figure 3-33

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5. Generation of Freehand Area

When the freehand mode is selected, the area enclosed on the document with a felt marker will be identified to generate a corresponding processing area.

During copying operation, the area is exposed to laser beams for removal of latent images within the area.

During the second copying operation, the area outside that enclosed by the marker is exposed to laser beams so that the area inside the area will be left for copying.

To maintain the quality of marker areas, the areas are copied in analog and then shaded or erased as necessary using laser beams.

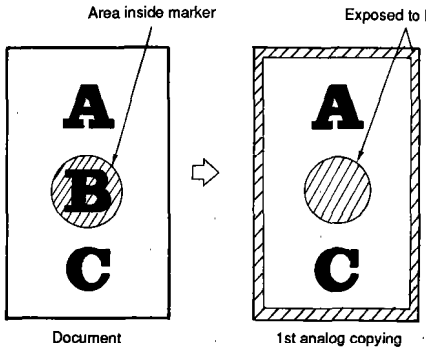

Figure 3-35

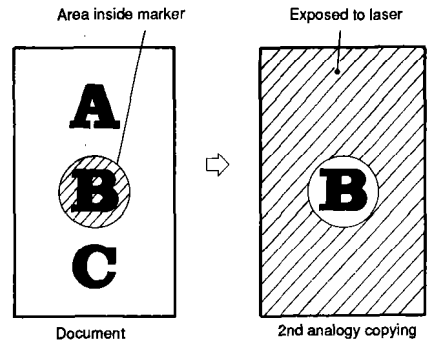

Figure 3-36

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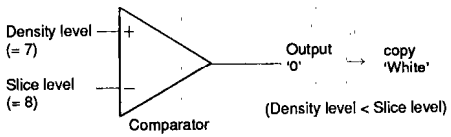
6. Binary Processing

Binary processing is executed to identify a single pixel in an area enclosed by a felt marker as being of a black level or a white level.

In practice, each pixel sends a density (intensity) signal according to the density of the image of the document; the signal is checked against the slice level for the above identification.



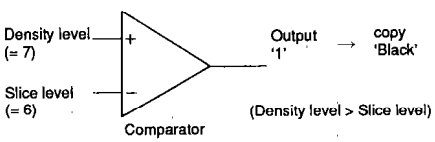


Figure 3-37

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7. Reduction/Enlargement Processing

a. Horizontal (main scanning direction)

When image data stored in memory is read, the read clocks are modified to vary the horizontal reproduction ratio.

b. Vertical (sub scanning direction)

The speed of the scanner is changed to vary the scanning width corresponding to a single pixel in relation to the document.

See Table 3-8 for detailed discussions.

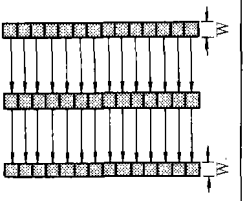
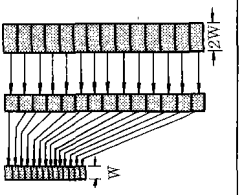
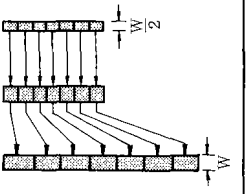
	DIRECT	REDUCE	ENLARGE
Document (image data) Line memory (write) Copy (read)			
Reproduction ratio in main scanning direction	All data are written into memory as they are and read as they are.	To reduce to 1/2, all data are written into memory as they are but read by increasing the read clock pulses.	To enlarge to × 2, all data are written into memory as they are but read by decreasing the read clock pulses.
Reproduction ratio in sub scanning direction		The scanner is moved at a higher speed, thereby increasing the scanning width corresponding to a single pixel in relation to the document.	The scanner is moved at a lower speed, thereby decreasing the scanning width corresponding to a single pixel in relation to the document.

Table 3-8

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8. Blank Control

The size of the copy paper and the area for framing, blanking, binding, and frame erasing are stored into RAM in response to a press on the COPY START key an equivalent of a single page.

If the area specified is as shown in Figure 3-38, the data written into RAM will be as shown in Figure 3-39; the data represents the X coordinates that have changed in the paper feed direction (X direction) and the main scanning direction (Y direction).

The data is read for each line of the main scanning direction, timed by the vertical sync signal (VSYNC) in response to the ITOP signal from the DC controller PCB.

When the BD signal is generated, the data in the main scanning direction is read, timed by the horizontal sync signal (HSYNC).

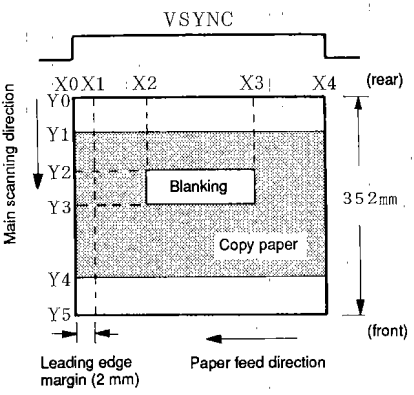

Figure 3-38 (blanking)

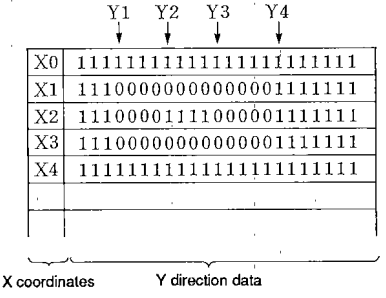

Figure 3-39 Area RAM Data (blanking)

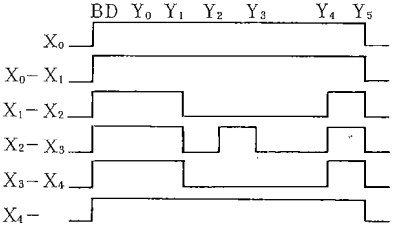

Figure 3-40 Laser ON Area (blanking)

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9. Add-On Control

a. Add-On Data

The data representing the data/time, headline, numbering, character input, and stamp modes and the data from the IC card are written into RAM on the image processor PCB, each character taking up 32 ×32 bits; a single stamp, however, takes up 32 units of 32 × 32 bits.

The position of the characters is also written to the register in Q621.

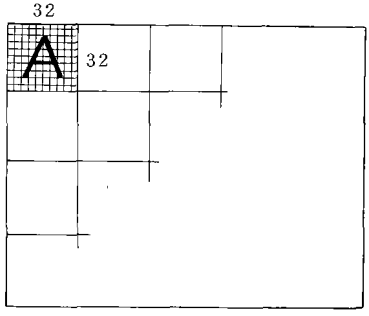

Figure 3-41 Add-On RAM Data

b. Screen/Highlight Data

The data for the screen and headline modes are already written in RAM on the image processor PCB in patterns as shown in Figure 3-42. Q621 reads the data repeatedly to generate screen and headline data.

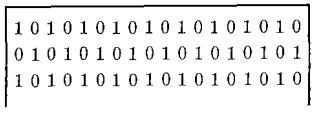

Figure 3-42 Screen RAM Data

c. 200dpi Control

IC cards are interchangeable with the NP-4835i, and the stamps and other data stored on the cards are formatted to enable 4-pel output.

In the NP-4080, the laser beam is generated at 200-dpi (8 pel, approx.); when generating data from and IC card, however, the output is converted to a 200-dpi equivalent. The use of a 200-dpi board, for this reason, can suppress jaggies in the data from the IC card; the images, in passing, are enhanced further by the smoothing circuit.

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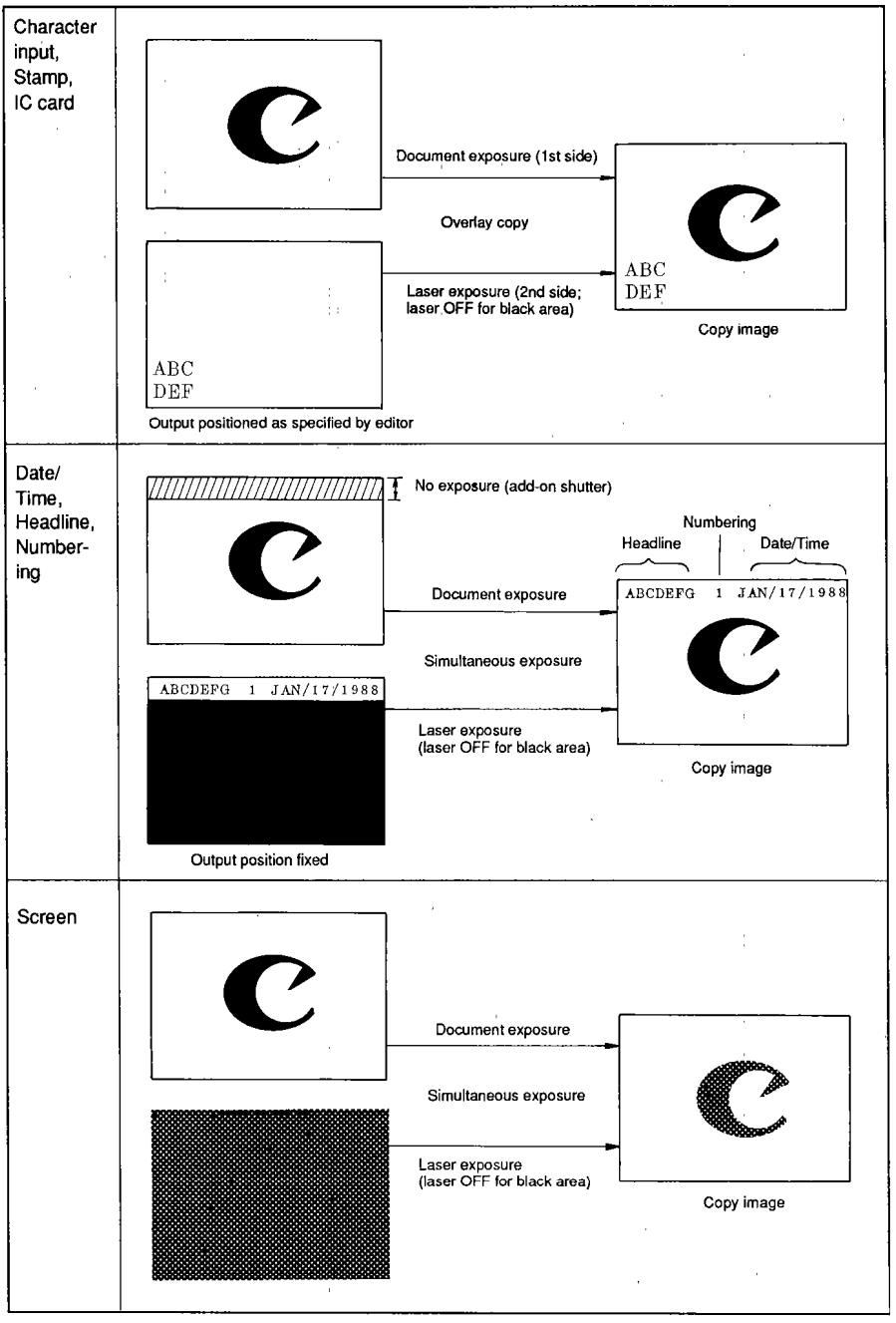

Table 3-9a

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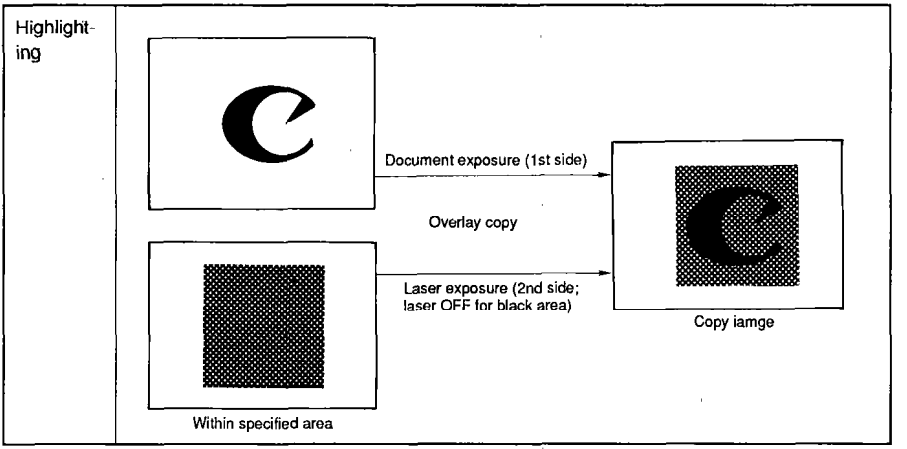

Table 3-9b

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E. Laser Processing Unit

1. Outline

As mentioned, the copier reproduces images by attracting toner to the areas of the photosensitive drum corresponding to the dark areas of the document (latent images). The copier uses a laser scanner to serve as a blank exposure unit to remove charges from the photosensitive drum.

The laser scanner consists of the laser unit as the source of light and the laser scanner equipped with a polygon mirror for scanning.

The laser beam generated by the laser unit is turned into a parallel light beam by a collimating lens and cylindrical lens; then, it is directed to the polygon mirror rotating at a specific speed.

The laser beam from the polygon mirror is focused on the photosensitive drum by a collimating lens located in front of the polygon mirror; the reflecting mirror is used to change the optical path.

As the polygon mirror rotates at a specific speed, the laser beam scans the photosensitive drum at a constant speed to remove the charge in the non-image areas.

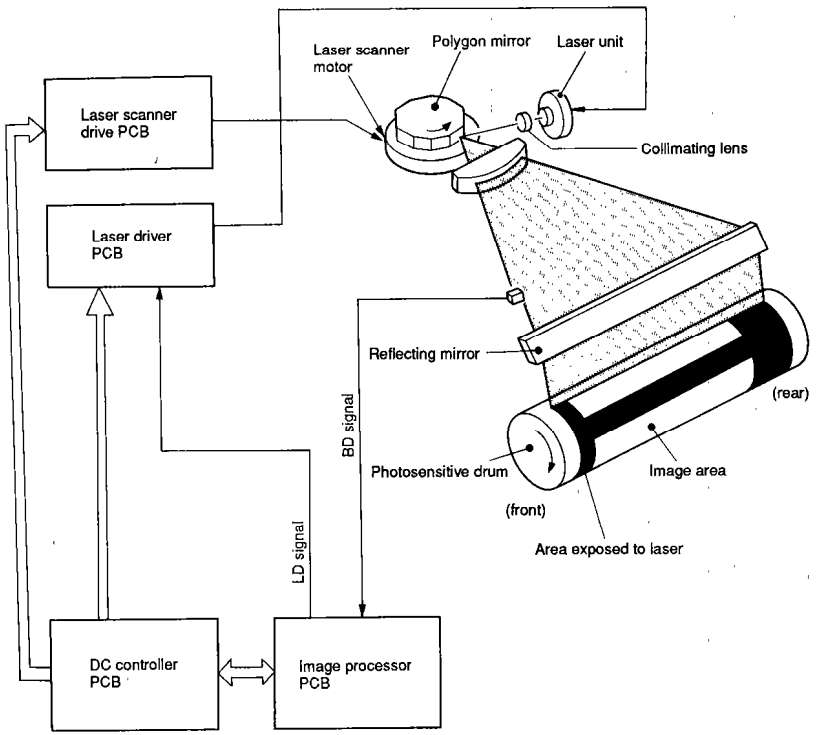

Figure 3-43

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2. Horizontal/Vertical Synchronization

a. Horizontal (main scanning direction)

To expose the photosensitive drum with a laser beam representing a single scan, a signal that starts the exposure (horizontal sync) is needed. Such a signal is generated in response to the output of the beam sensor signal (BD).

The laser beam reflected by the BD mirror in the optical path is sent to the image processor circuit through an optical fiber for generation of the BD signal.

Based on the BD signal, the horizontal sync signal (HSYNC) is generated in the image processor circuit, and the processed image data are sent to the laser drive circuit.

The laser beam is forced ON to remove the charge from the non-image area at the front; the affected width is an equivalent of 11.5 mm.

Then, the laser beam is controlled to suit the copy size, reproduction ratio, add-on or other selected modes.

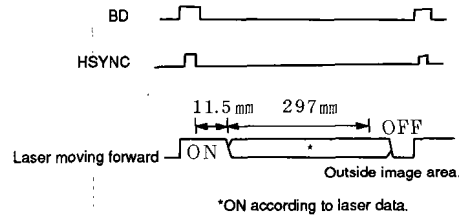

Figure 3-45

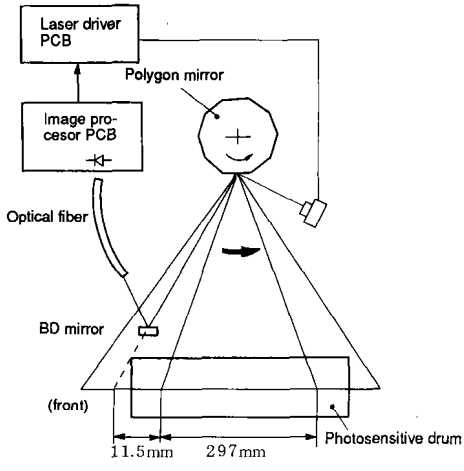

Figure 3-44

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b. Vertical (sub scanning direction)

When the scanner has started to move forward and the scanner document leading edge signal (SCDP) reaches the image processor circuit, the vertical sync signal (VSYNC) is generated.

The VSYNC signal controls when to turn the laser ON, making sure that the leading edge of the optical image on the document and the beam of the laser match.

In practice, the optical image of the document and the position of the laser beam has a discrepancy of about 2.5 mm; the VSYNC signal, therefore, is sent with a delay equivalent of about 2.5mm.

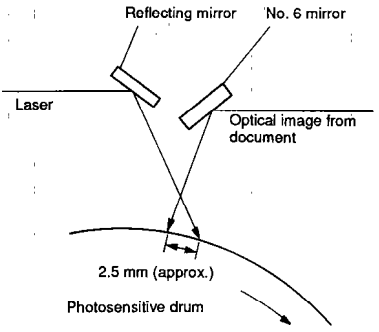

Figure 3-46

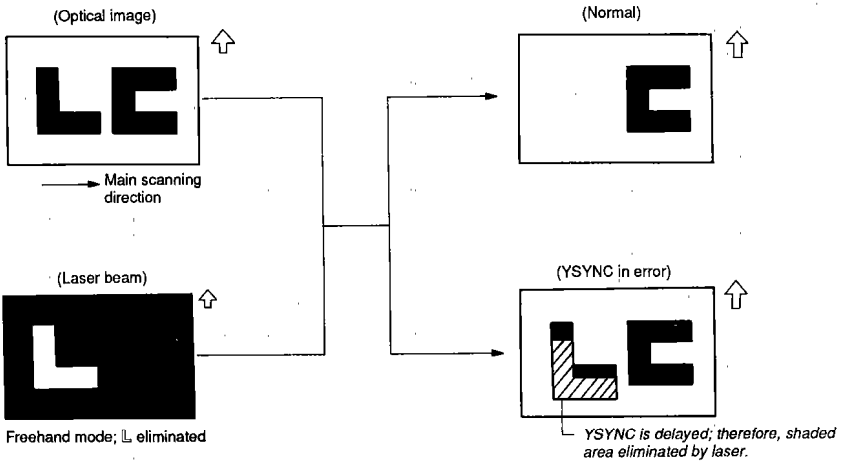

Figure 3-47

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3. Add-On Shutter Control

When the date/time, headline, or numbering mode is selected, the output print will be at the point shown in Figure 3-49.

If the area of the document corresponding to the front side of the drum is white, the area will be all white on the drum even if the laser is turned OFF.

To prevent the above, a shutter is provided between No. 5 mirror and No. 6 mirror; the shutter is opened when characters are output so that no light hits the area at the front over a width of about 8 mm.

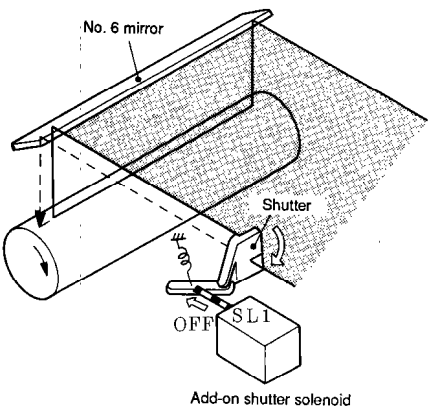
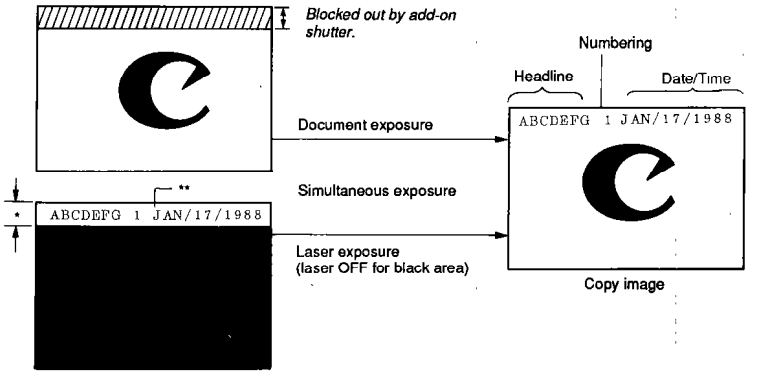


Figure 3-48



* Width may be varied under 'AD-A' in service mode (✳3✳).
** Position may be varied under 'AD-P' in service mode (✳3✳).

Figure 3-49

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4. Controlling the Intensity of the Laser

The copier's laser unit is not equipped with a mechanism to control temperature and, therefore, changes in temperature inside the machine would not allow the intensity of the laser to remain stable if no measure was taken. The intensity of the laser is controlled by the copier's CPU.

During mitial rotation and while the scanner is moving in reverse, the CPU, located on the DC controller circuit, controls the image processor circuit to maintain the laser drive signal (LD) always '1', thereby keeping the laser ON.

At the same time, the intensity adjusting signal (LDATA) is sent to Q500 on the laser driver until the intensity of the laser reaches a specific value.

The operation is repeated during initial rotation and while the scanner is moving in reverse to maintain the intensity of the laser constant.

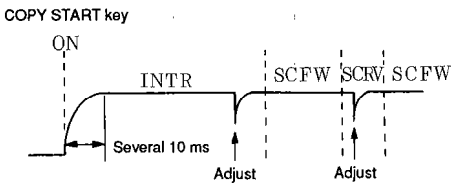

Figure 3-51 Laser Intensity Adjustment

Note:
The light intensity adjustment signal (LDATA) is adjusted at the factory; however, it needs adjutment if the DC controller PCB or the laser driver PCB has been replaced in the field. Use 'LASER' of the service mode. Without the adjustment, problems represented by 'E140' may occur.

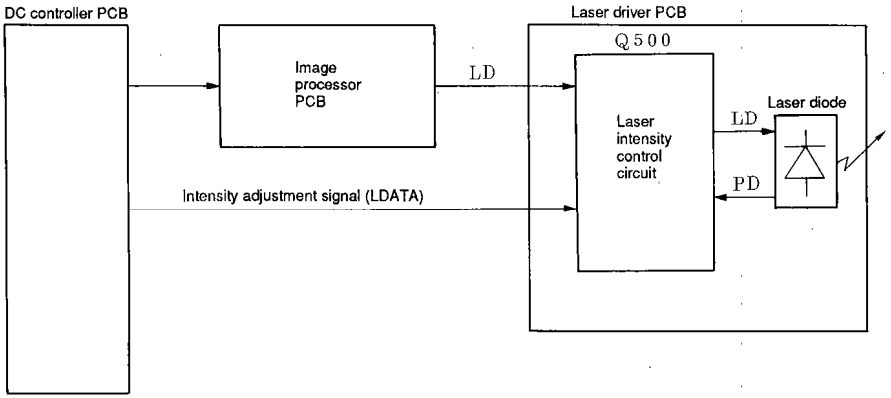

Figure 3-50

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5. Controlling the Laser Scanner Motor

Figure 3-52 shows the circuit that controls the laser scanner motor (ML) used to rotate the polygon mirror.

When the DC controller circuit causes the laser scanner drive signal ($\overline{LMD}$) to go '0', the rotation speed control circuit controls the voltage of the laser scanner motor control signal (LMC) so that the laser scanner motor clock (LMCLK) is of a specific frequency.

The laser scanner motor rotates at two different speeds; it rotates at a high speed when the laser scanner motor high-speed signal (LMH) is '1' and rotates at a low speed during standby.

This consideration not only increases the speed of warm-up for each copy run, but also lengthens the life of the motor. A higher LMC voltage increases the rotation speed of the motor.

When the frequency of LMCLK is within specified values, the rotation speed control circuit generates the laser scanner motor ready signal ($\overline{LMRDY}$=0). The DC controller indicates 'E110' if LMRDY=1 occurs while the laser scanner motor is rotating.

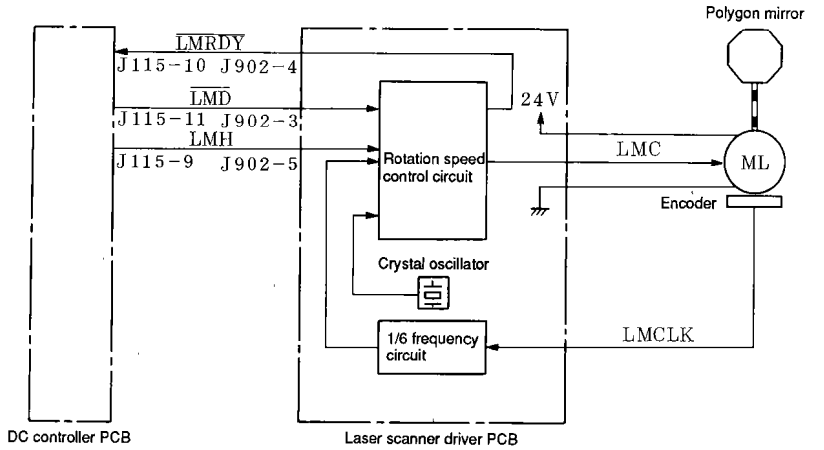

Figure 3-52

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IV. IMAGE FORMATION SYSTEM

A. Outline

The copier's image formation system controls the following:

- the scanning lamp
- the primary/transfer corona current and grid bias
- pre-transfer/separation corona current
- developing bias
- laser exposure

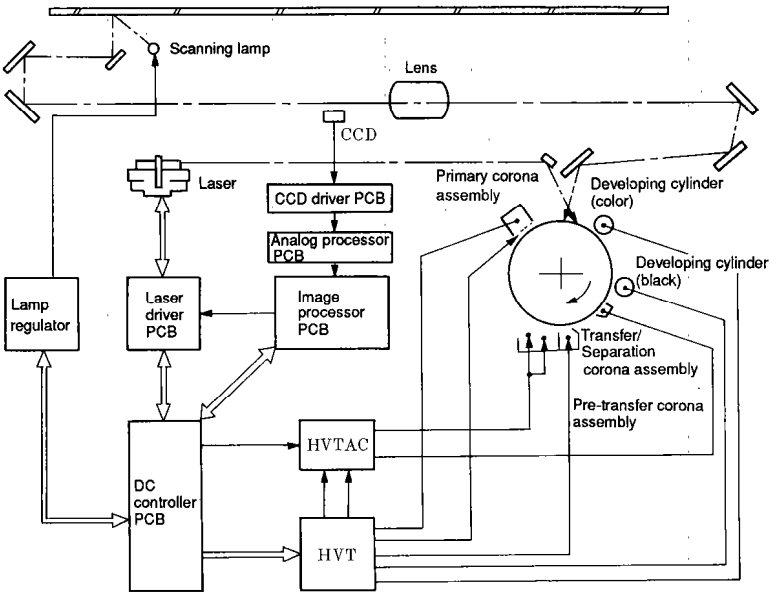

Figure 3-53

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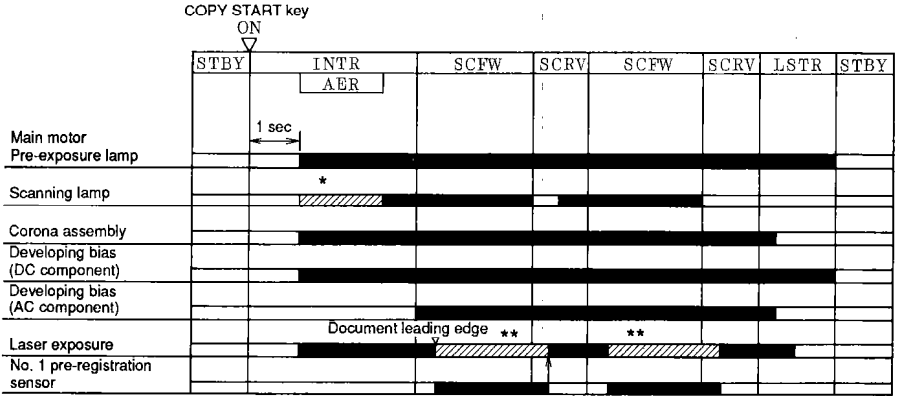
B. Sequence of Operations



*ON during AE only.
**ON depending on the reroduction ratio, copy paper size, copy mode, and add-on effects.

Figure 3-54

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C. Controlling the Intensity of the Scanning Lamp

1. Outline

Figure 3-55 shows the circuit that controls the intensity of the scanning lamp; the circuit has the following functions:

(1) Turns the scanning lamp ON and OFF
(2) Checks if the scanning lamp is ON
(3) Controls the intensity of the scanning lamp
- Maintains the intensity constant against fluctuations in power supply voltage
- Controls the intensity according to the settings of the COPY DENSITY key (manual mode)
- Controls the intensity according to the density of the document (AE mode)
- Lowers the intensity for the following:
  photo mode: by 18.9 V
  64% repro ratio or lower: by 3.3 V

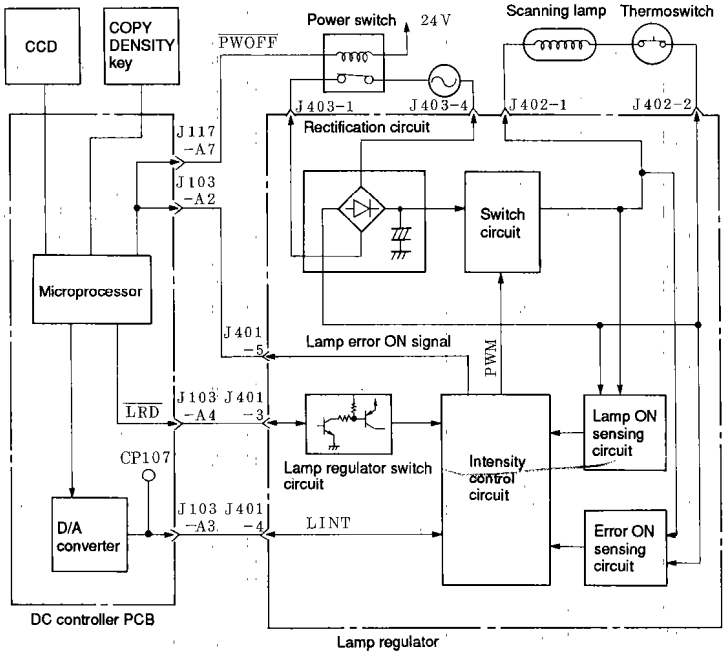

Figure 3-55

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2. Mechanism

a. Controlling the Scanning Lamp ON and OFF

When $\overline{LRD}$=1, the output of the lamp regulator switching circuit goes '0', causing the intensity control circuit to go OFF and, in turn, the scanning lamp (LA1) to go OFF.

When $\overline{LRD}$=0, the output of the lamp regulator switching circuit goes '1', causing the intensity control circuit to go ON and, in turn, the scanning lamp (LA1) to go ON.

b. Checking Scanning Lamp Error Activation

When the scanning lamp (LA1) is ON, the lamp error sensing circuit also goes ON.

If a fault in the microprocessor or the lamp regulator causes the scanning lamp to remain ON about 50 sec or more, the error ON sensing circuit goes ON to turn the power switch OFF.

c. Controlling the Intensity of the Scanning Lamp

The intensity of the scanning lamp is varied by controlling the supply voltage to the scanning lamp based on the intensity adjustment signal (LINT).

The LINT signal varies between 10 and 16 V depending on the setting of the COPY DENSITY key and the settings made in the service mode so that the supply voltage to the scanning lamp will vary between +98 and +175 V in terms of effective values (PWM control).

If the intensity of the scanning lamp fluctuates when measurements are taken of the document, the CCD may not be able to obtain correct measurements; to prevent such a problem, the intensity of the scanning lamp is fixed to a specific value. In other words, the copy density control mechanism does not vary the intensity of the scanning lamp but, rather, varies the gird bias and the developing bias of the primary corona assembly.

In the red elimination mode, the light intensity control mechanism is used between F1 and F7 (copy density readings) and a grid bias is used between F7 and F9.

3. Automatic Exposure (AE) Control

a. Outline

The copier is equipped with an automatic exposure mechanism that automatically controls the intensity of the scanning lamp according to the density of the document.

When the copier is used in the AE mode, copies free of fogging may be obtained without manually changing the copy density to suit the document density; this is true as long as the document is more or less uniform in density.

The intensity of the lamp controlled in the AE mode is indicated on the copy density indicator on the control panel.

b. Control Mechanism

The scanning lamp is turned ON during initial rotation (INTR) to move the scanner from the home position to the scanner document leading edge sensor (Q9) for shading correction; thereafter, the scanner is moved forward about 30 mm to expose the document.

The scanner is moved in reverse about 15 mm after exposure to expose the document once again.

The light reflected at two points within the area of the document shown in Figure 3-56 is read by the CCD and communicated to the DC controller circuit for a single line.

The DC controller circuit computes the optimum intensity for the scanning lamp for copying operation based on the above input and sends the result in the from of the intensity adjustment signal (LINT) to the lamp regulator.

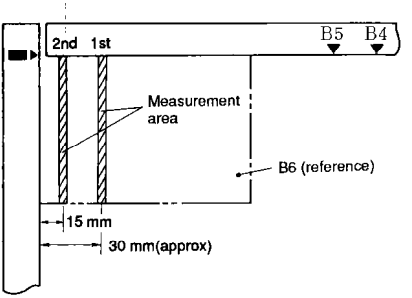

Figure 3-56

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Figure 3-57 shows the changes in the intensity of the scanning lamp in relation to different document densities.

The graph is based on the amount of exposure that ensures the fogging-free optimum density when a newspaper or the Test Sheet is copied.

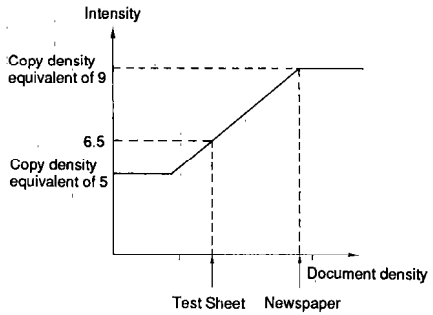

Figure 3-57

4. Checks (on input signals)

- Voltage of J103-A4 (DC controller PCB)
  Make sure that the voltage between GND and J103-A4 ($\overline{\text{LRD}}$) on the DC controller PCB is about 0 V while the scanner is moving forward and about 24 V during initial rotation and while the scanner is moving in reverse.
  If the voltage does not change as above, it is most likely that the DC controller is faulty.
- Voltage of CP107 (DC controller PCB)
  Make sure that the voltage between CP107 (LINT) and GND on the DC controller PCB is between 10 and 16 V (approx.) during copying operation and each press on the COPY DENSITY key causes the voltage to vary.

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5. Adjusting the Intensity and AE

Table 3-10 discusses those items that can be adjusted on the scanning lamp intensity control circuit.

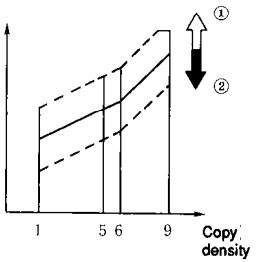
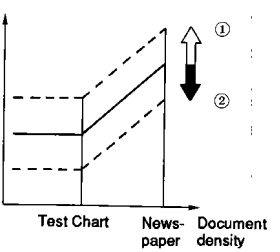
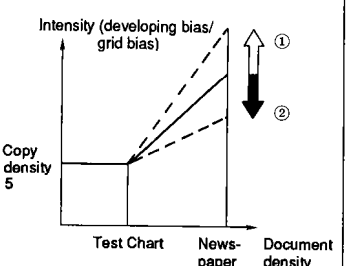
Item	Adjustment	Description	Remarks
✱ 3 ✱ LIGHT_BK	Optimum exposure (copy density 5)	(manual) Intensity 	i. If the setting is increased in the service mode, the intensity during copying operation increases and the copy density will decrease. ii. If the setting is decreased in the service mode, the intensity during copying operation decreases and the copy density will increase.
✱ 3 ✱ LIGHT_R	Increases or decreases the intensity in relation to the setting of LIGHT_BK.	(AE) Intensity 	
✱ 4 ✱ AE_SLOP	AE slope		i. If the setting is increased in the adjustment mode, the copies of newspapers will decrease. ii. If the setting is decreased in the adjustment mode, the copies of newspapers will increase.

Table 3-10

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D. Controlling the Primary/ Transfer Corona Current Grid Bias

1. Outline

Figure 3-58 shows the circuit that controls the primary/transfer corona and the grid bias, and the circuit has the following functions:

- Turns the primary/transfer corona current ON and OFF.
- Maintains the primary corona current constant.
- Switches values for the transfer corona current.
- Switches the grid bias for the primary corona assembly.

The output of the machine's primary corona assembly is controlled to a specific value to eliminate the effects of the environment on the corona discharge. The output of the transfer corona assembly and the grid bias varies according to the output of the primary corona assembly.

The primary/transfer current and the grid bias are turned ON and OFF by the primary corona level control command (HVPR) generated by the DC controller circuit.

When two-sided or overlay copies are made, the transfer corona current is switched by the transfer corona level control command (HVTR) generated by the DC controller circuit.

In the photo mode, the high voltage applied to the primary corona assembly grid wire is switched by the grid bias control command (HVGB) generated by the DC controller circuit.

To limit the dirt on the primary corona wire, a bias identical to that applied to the grid wire is applied to the shield plate of the primary corona assembly.

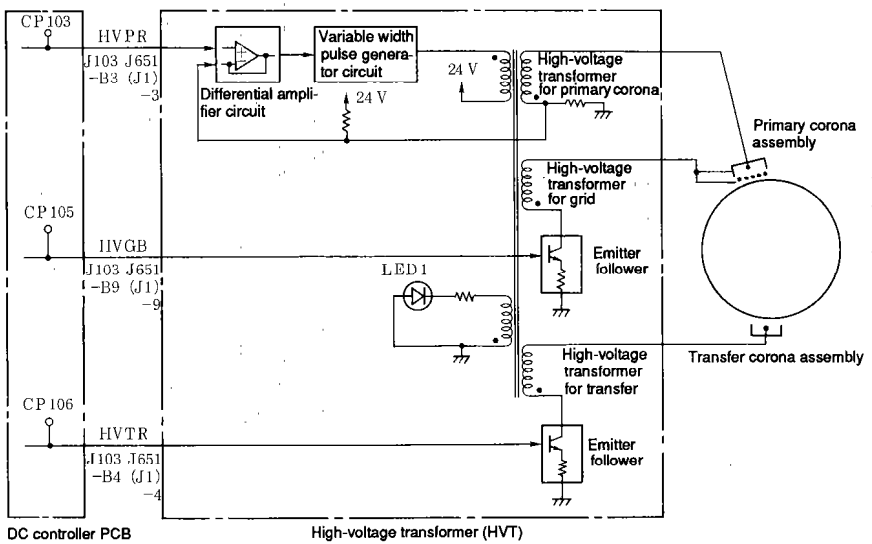

Figure 3-58 Primary/Transfer Corona Current Grid Bias Control Circuit

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For most analog copying, the intensity of the scanning lamp is varied to control the density of copies; in the Freehand mode, however, it would be difficult for the CCD to read images correctly if the intensity of the scanning lamp was varied.

For this reason, the density of the copies is controlled by varying the grid bias (copy densities 6 through 9).

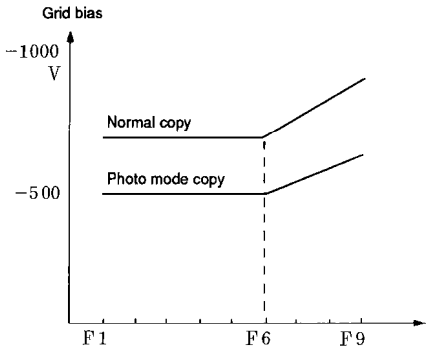

Figure 3-59

For copy densities between 1 and 6, the developing bias is varied to control the density of the copies.

The CCD is not used in the red elimination mode; for copy density readings between F7 and F9, the copy density is controlled using a grid bias.

2. Mechanism

The primary/transfer corona current and the grid bias are turned ON and OFF by HVPR; the differential amplifier circuit shown in Figure 3-58 operates when HVPR is about 8 V or more.

a. High-voltage output is ON

HVPR control signal is output.
→ Differential amplifier circuit goes ON.
→ Variable width pulse generator goes ON.
→ LED1 goes ON.
→ High-voltage transformer goes ON.

At the time, the corona current sent to the transfer corona assembly is of a value suitable to HVTR. Likewise, the grid bias sent to the grid wire of the primary corona assembly is of a value suited to HVGB.

If a corona current larger than the specific value flows from the primary corona assembly because of changes in the environment, the level of the feedback signal to the differential amplifier circuit increases and, as a result, the output of the differential amplifier decreases; consequently, the corona current from the primary/transfer corona assembly will decrease, controlling the current to a constant value at all times.

b. High-voltage output is OFF

HVPR is about 7.5 V.
→ Differential amplifier circuit is OFF.
→ Variable width pulse generator circuit goes OFF.
→ LED1 goes OFF.
→ High-voltage transformer goes OFF.

If '1' is set under 'TRN_CHG' in the service mode (✱ 5 ✱), the transfer output will be 50μA larger than the setting made under 'TRN_1, TRN_2' in the service mode (✱ 3 ✱).

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E. Separation/Pre-Transfer Corona Current Control

1. Outline

Figure 3-60 shows the circuit that controls the separation/pre-transfer corona, and the circuit has the following functions:

- Turns the separation/pre-transfer corona current ON and OFF.
- Maintains the separation/pre-transfer corona current constant.
- Switches the separation corona current.

The machine's separation/pre-transfer corona current is controlled in the same way as the primary corona assembly, i.e., by constant current control.

The separation/pre-transfer corona current is turned ON and OFF and the separation corona current is switched by the following three signals generated by the DC controller circuit:

- separation corona level control command (HVSP)
- pre-transfer corona level control command (HVPT)
- AC transformer drive command (HVAC)

2. Mechanism

The two differential circuits shown in Figure 3-60 go ON when HVSP or HVPT is 16 V or less.

a. Separation/Pre-transfer high-voltage output is ON

HVSP/HVPT control signal is output.
→ Differential amplifier circuit goes ON.
→ Variable width pulse generator circuit goes ON.
→ High-voltage transformer for separation goes ON.
→ High-voltage transformer for pre-transfer goes ON.

In this condition, the DC component of each high voltage is output. At the time, $\overline{HVAC}$ is '0', causing the high-voltage AC transformer to go ON; the high-voltage AC transformer outputs both DC and AC components. At the time, the separation/pre-transfer corona current are of values suited to HVSP and HVPT.

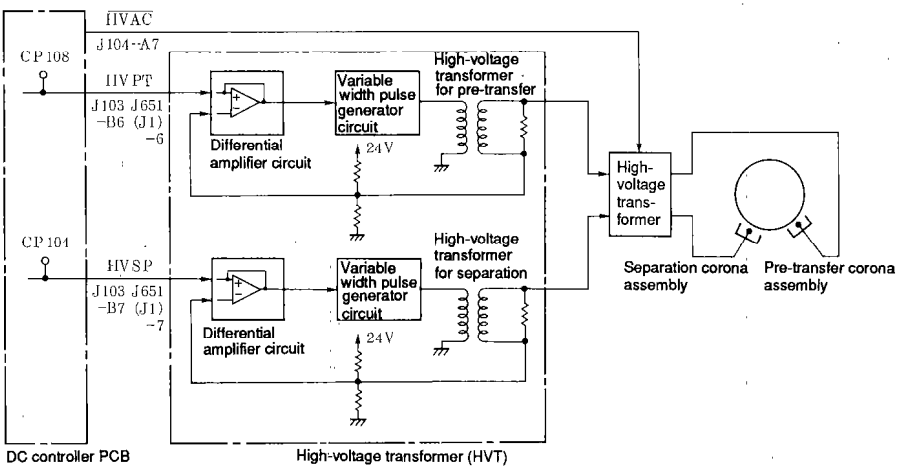

Figure 3-60 Separation/Pre-Transfer Corona Current Control Circuit

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b. Separation/Pre-transfer high-voltage output is OFF.

HVSP/HVPT is about 17 V.
└→ Differential amplifier circuit goes OFF.
└→Variable width pulse generator circuit goes OFF.
├→High-voltage transformer for separation goes OFF.
└→High-voltage transformer for pre-transfer goes OFF.

At the time, $\overline{\text{HVAC}}$ is '1', causing the high-voltage AC transformer to go OFF.

F. Controlling the Developing Bias

1. Outline

Figure 3-62 shows the circuit that controls the developing bias, and the circuit has the following functions:

- Turns the developing bias AC component ON and OFF.
- Turns the developing bias DC component ON and OFF.
- Controls the developing bias DC component voltage level.

All these controls are executed based on the following two signals generated by the DC controller circuit.

- developing bias AC drive signal ($\overline{\text{HVBAC}}$)
- developing bias DC level control signal (HVBDC)

For most analog copying, the intensity of the scanning lamp is varied to control the density of copies; in the Freehand mode, however, it would be difficult for the CCD to read images correctly if the intensity of the scanning lamp was varied.

For this reason, the density of the copies is controlled by varying the DC component of the developing bias (copy densities 1 through 6).

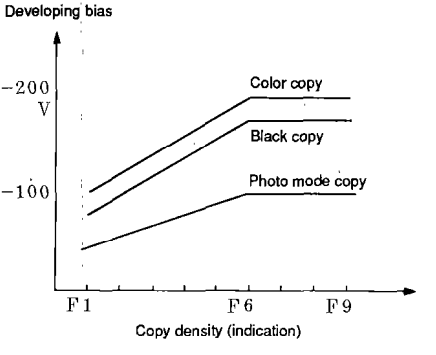

Figure 3-61

For copy densities between 6 and 9, the grid bias is varied to control the density of the copies.

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2. Mechanism

a. Turning the AC Bias ON and OFF

Turning the AC Bias OFF

- $\overline{\text{HVBAC}}$ is '1'.
  - → Pulse generator circuit goes OFF.
    - →AC high-voltage transformer goes OFF.

The above condition cuts off the AC bias to the developing cylinder.

Turning the AC Bias ON

- $\overline{\text{HVBAC}}$ is '0'.
  - → Pulse generator circuit goes ON.
    - →AC high-voltage transformer goes ON.

The above condition supplies the developing cylinder with the AC bias.

b. Turning the DC Bias ON and OFF and Controlling the Voltage Level

The differential amplifier circuit shown in Figure 3-62 goes ON when HVBDC is 16V or less.

- DC bias is OFF.
  - HVBDC is about 17 V.
    - → Differential amplifier circuit goes OFF.
      - →Variable width pulse generator goes OFF.
        - → DC high-voltage transformer goes OFF.

The above condition cuts off the DC bias to the developing cylinder.

- DC bias is ON.
  - HVBDC is 8 to 16 V.
    - → Differential amplifier circuit goes ON.
      - →Variable width pulse generator circuit goes ON.
        - → DC high-voltage transformer goes ON.

The above condition supplies the developing cylinder with the DC bias.

HVBDC varies between 8 and 16 V according to the setting made in the service mode.

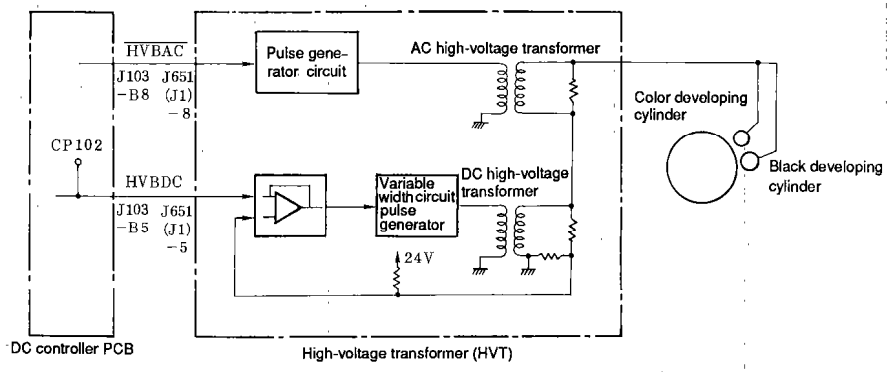

Figure 3-62

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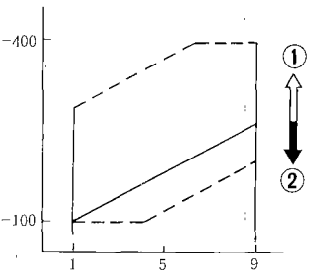
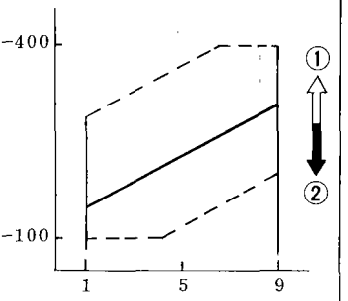
3. Adjustment

Table 3-11 shows the items that can be adjusted using the developing bias control circuit; make sure that the copy density correction setting is the middle value in the user asterisk mode (✳ 10 OK).

<table>
<tr><th>Item</th><th>Adjustment</th><th>Description</th><th>Remarks</th></tr>
<tr><td>✳ 3 ✳
(BIAS-N)</td><td>Developing bias DC component</td><td rowspan="2">Developing bias DC component
 

COPY DENSITY CORRECTION key</td><td rowspan="2">① If the setting is increased in the service mode, the DC component for black copying will increase, thereby decreasing the copy density.
② If the setting is decreased in the service mode, the DC component for black copying will decrease, thereby increasing the copy density.</td></tr>
<tr><td>BIAS-CCD
BIAS-MKR</td><td>Increases or decreases the DC component in relation to the adjusted development bias.</td></tr>
<tr><td>✳ 3 ✳
(BIAS-C)</td><td>Developing bias DC component (color copy; developing bias 2000 Hz, 1700 VAC p-p)</td><td rowspan="3">Developing bias DC component
 

COPY DENSITY CORRECTION key</td><td rowspan="3">① If the setting is increased in the service mode, the DC component of developing bias for color copying will increase, thereby decreasing the color copy density.
② If the setting is decreased in the service mode, the DC component of the developing bias for color copying will decrease, thereby increasing the color copy density.</td></tr>
<tr><td>BIAS-BL
BIAS-GR
BIAS-BR</td><td>Increases or decreases the DC component in relation to the developing bias adjusted under BIAS-C.</td></tr>
<tr><td>BIAS-CCD
BIAS-MKR</td><td>Increases or decreases the DC component in relation to the developing bias adjusted under BIAS-C, _BL, _GR, and _BR.</td></tr>
</table>

Table 3-11

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G. Developing Assembly and Cleaner Assembly

1. Outline

The black developing assembly and the CD unit are locked or released by the black developing assembly release spring clutch.

The developing assembly and the drum cleaner are driven by the main motor (M1).

The waste toner scraped by the cleaning blade is forwarded to the inside of the photosensitive drum for collection.

The level of toner inside the black developing assembly and the hopper is monitored by the toner sensor (Q17) and the hopper toner sensor (Q18).

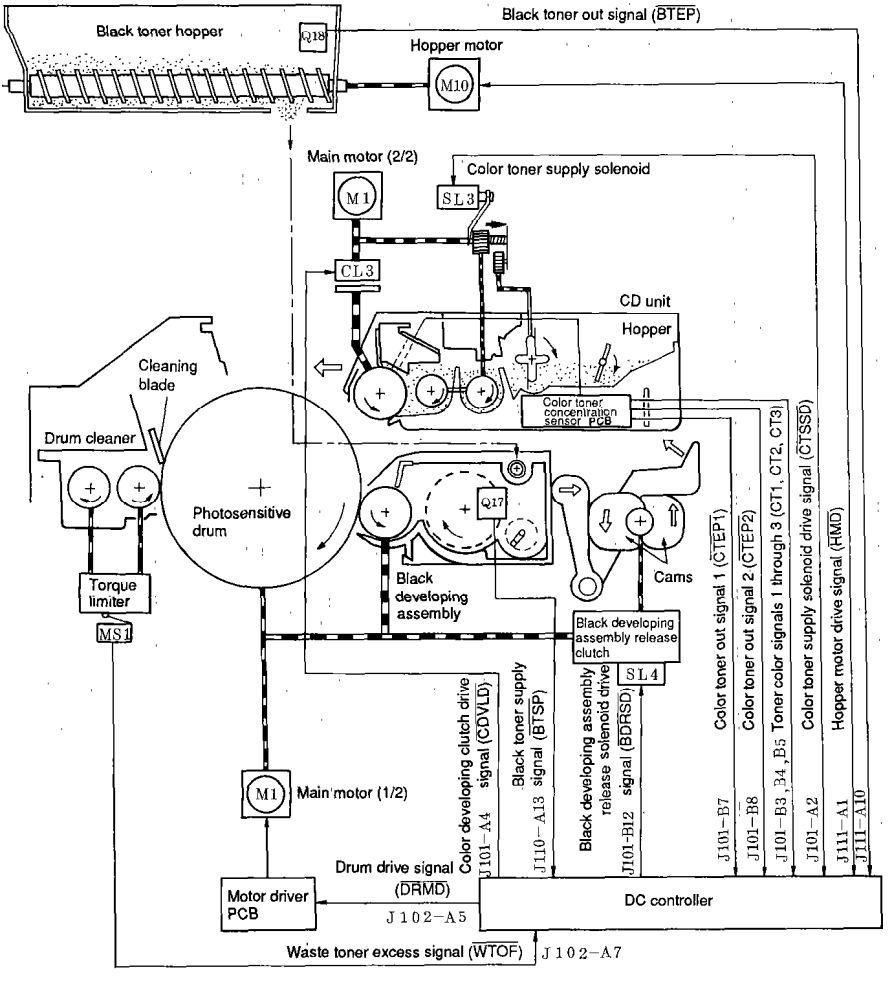

Figure 3-63

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2. Checking and Supplying Black Toner

The level of black toner inside the black developing assembly is checked by the toner sensor (Q17); when the black toner falls below a specific level, the hopper motor (M10) starts to rotate, supplying black toner to the black developing assembly from the black toner hopper.

When the hopper runs out of black toner and the toner sensor (Q18) in the hopper remains ON for 10 seconds, the copying operation is stopped immediately and the 'ADD TONER' message is displayed. If the RDF is used at the time, the document, if any, on the copyboard glass will be discharged.

Note:
The detector of the toner sensors used in the black toner hopper and the black developing assembly is a piezoelectric oscillator that oscillates at several kHz in the absence of toner, causing the output of the sensor to go '0'. If toner is present, the weight of the toner stops the oscillation of the oscillator, causing the output of the sensor to go '1'.

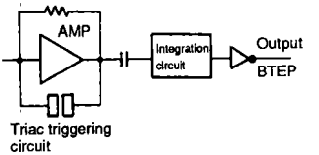
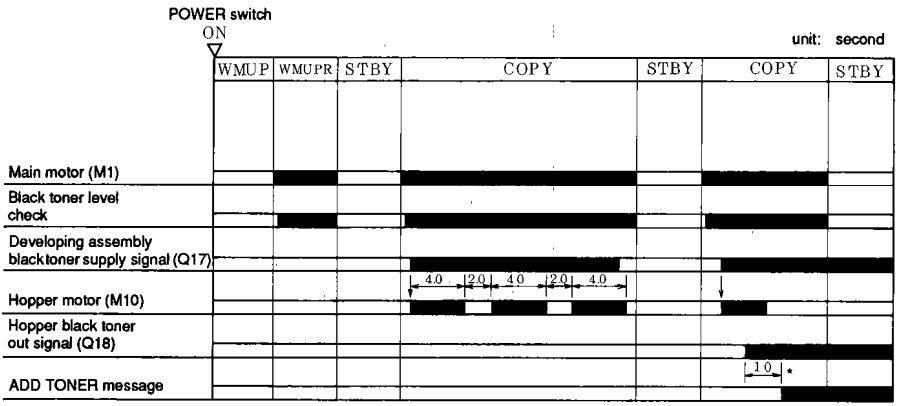


Figure 3-64A



* The ADD TONER message goes ON if the black toner out signal remains ON for 10 sec while the hopper motor is rotating.

Figure 3-64

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3. CD Unit

a. The toner concentration sensor circuit used for the CD unit shines the developer on the developing cylinder by a lamp and measures the reflected light to determine the concentration of the developer.

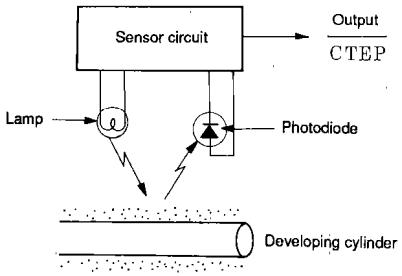

Figure 3-65

If the concentration of the developer drops below a specific value, the color toner supply solenoid (SL3) goes ON to supply toner to the cylinder assembly from the hopper of the CD unit.

If the concentration fails to go up after the color toner supply solenoid has remained ON for more than a specific time, the ongoing copying operation will be stopped and the 'ADD COLOR TONER' message is indicated. The document on the copyboard glass will be discharged if the RDF is used at the time.

The color of the toner inside the CD unit is identified as shown in Table 3-12 using the toner color signals 1, 2, and 3 sent from the color toner concentration circuit; see Figure 3-68.

Signal	Red	Blue	Green	Brown	CD unit absent
Toner signal 1 (CT1)	0	1	0	1	1
Toner color signal 2 (CT2)	0	0	1	1	1
Toner color signal 3 (CT3)	0	0	0	0	1

Table 3-12

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b. Toner Supply Sequence

Figure 3-67 shows the sequence by which toner is supplied when the concentration of the developer changes as Figure 3-66 in relation to the levels of the color toner out signals (CTEP1, CTEP2).

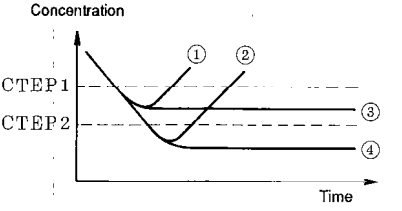
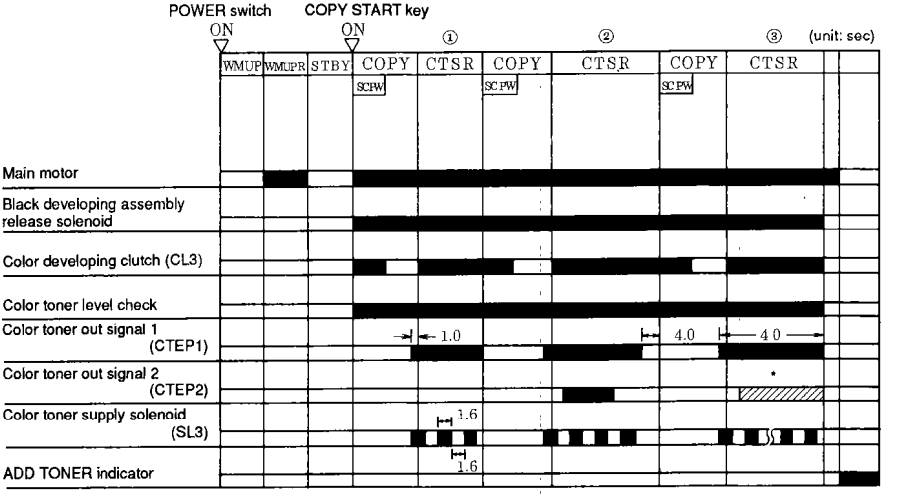


Figure 3-66



* '1' and '0' of CTEP2 do not affect the sequence.

Figure 3-67

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c. Color Toner Concentration Sensor Circuit

The light from the lamp shines the toner on the cylinder, and the reflected light is monitored by a photodiode (Q858). The light coming directly from the lamp is used to determine the reference value and is monitored by Q857.

The outputs of Q858 and Q857 are amplified by operation amplifiers 1 and 2 and sent to comparators 1 through 4. These comparators operate as follows depending on the voltage of points A through E.

B<A : $\overline{\text{CTEP2}} = 0$
D<A : $\overline{\text{CTEP1}} = 0$
C>A>E : LED851 ON

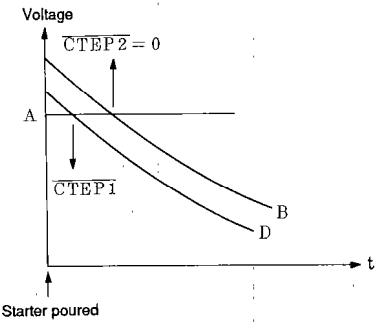

Figure 3-69

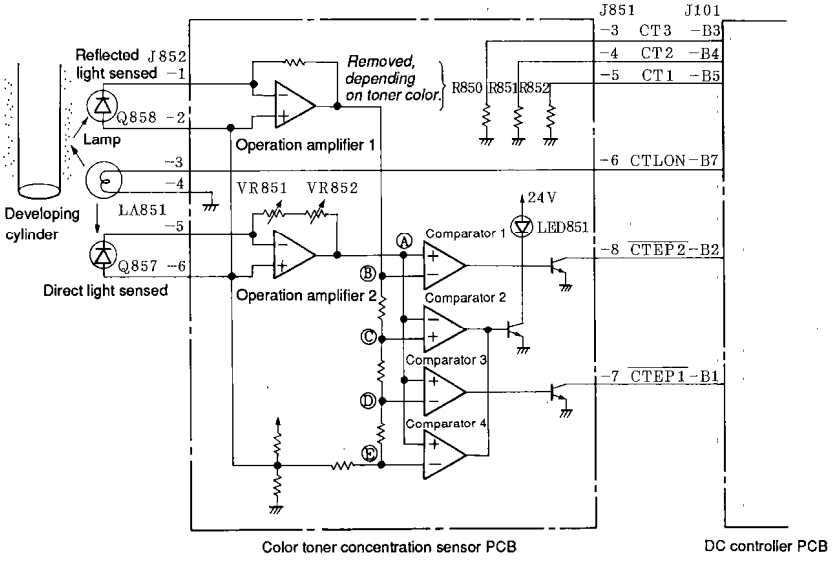

Figure 3-68

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- At Time of Installation (starter poured)
  operation amplifier 1 output B is 12 to 13 V*

  ↓

  voltage of C, 0.07 V lower than 0.07 V*
  voltage of E, 0.14 V lower than B

  ↓

  Turn VR851/VR852 so that the voltage of A is between those of C and E.

  ↓

  LED851 goes ON.

* Varies depending on the color of the toner.

- Developer Concentration Low
  D<A → $\overline{\text{CTEP1}}$ = 0
  If the concentration lowers further,
  B<A → $\overline{\text{CTEP2}}$ = 0

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4. Checking Waste Toner

When the photosensitive drum rotates, its drive is transmitted to the drum gear, cleaning roller gear, screw gear, coupling, and feedscrew in the order named; the feedscrew serves to forward waste toner collected by the cleaning blade and the cleaning roller to the photosensitive drum for storage.

The coupling transmits drive when forced against the screw gear.

When the photosensitive drum and the pipe become full of toner, the feedscrew starts to drag, causing the coupling to move up and cutting the drive to the feedscrew; this condition causes the lever to press the microswitch (MS1).

Note:
The photosensitive drum becomes full with waste toner after making about 120,000 copies (6% black document).

Note:
At the time, the 'WASTE TONER FULL' message is indicated; advise the user to make a serviceman call when the message appears. You can still make about 200 copies after the message appears; however, be sure to replace the drum as soon as possible, as failure to do so can damage the drive assembly.
Further, the message will not disappear even when the drum is replaced; clear the message using 'ERROR' in the service mode (✱ 4 ✱).

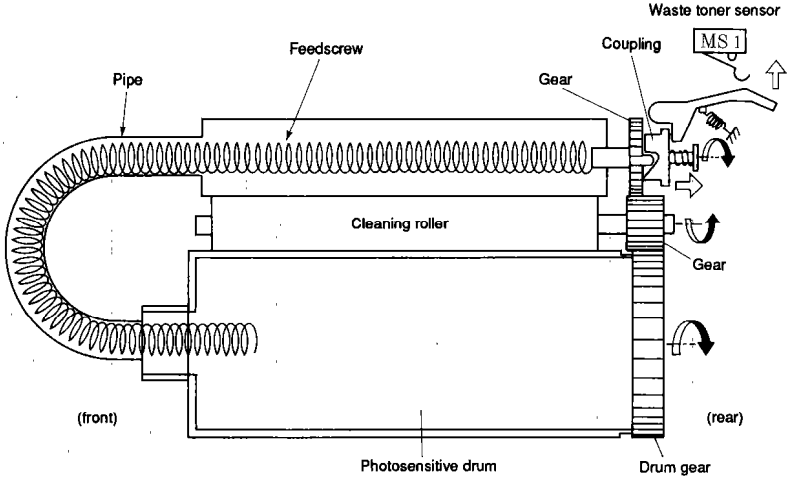

Figure 3-70

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H. Controlling the Corona Wire Cleaning Mechanism

1. Outline

The machine is equipped with an automatic cleaning mechanism for the primary corona wire and the separation/transfer corona wire.

These mechanisms clean each respective corona wire under the following conditions:

i. The temperature of the fixing assembly is 100°C or less when the machine is switched ON.
ii. The mechanism is activated in the user mode.
iii. The cleaner is not at the home position when the machine is switched ON.
iv. When last rotation (LSTR) is over after each 2,000 copies; if the mechanism has been activated under condition i., ii., or iii. above, however, th 2,000 th copy after the execution.

2. Cleaning the Corona Wire

Each corona wire is cleaned by moving the corona cleaner back and forth.

Each corona wire cleaner is driven by the cleaning motor; the cleaner is moved forward starting at the corona wire cleaner home position switch (MS7, MS5) located at the front of each corona assembly.

When the corona wire cleaner has reached the corona wire cleaner reversal switch (MS8, MS6), the cleaner is moved back to the home position. A single cleaning operation makes a single round trip in about 20 sec.

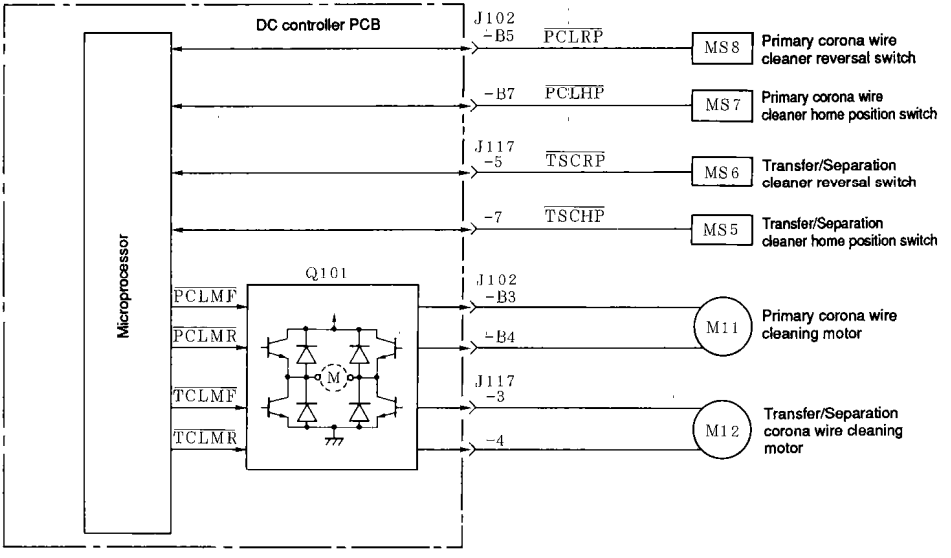

Figure 3-71

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3. Controlling the Corona Wire Cleaning Motor

The corona wire cleaning motor is controlled by the corona wire cleaner forward command ($\overline{PCLMF}$/$\overline{TCLMF}$) and the corona wire cleaner reverse command ($\overline{PCLMR}$/$\overline{TCLMR}$).

	$\overline{PCLMF}$ $\overline{TCLMF}$	$\overline{PCLMR}$ $\overline{TCLMR}$
Forward	0	1
Reverse	1	0
At rest	1	1

Table 3-13

4. Checking the Cleaning Operation for Error

If the corona wire cleaner moves forward or in reverse as follows, the microprocessor on the DC controller PCB identifies the conditions to be an error.

a. MS8 (MS6) does not detect the corona wire cleaner about 20 sec after the cleaner started to moved forward.
b. MS7 (MS5) does not detect the corona wire cleaner about 20 sec after the cleaner started to move in reverse.

Under any of the above conditions, the corona wire cleaning motor is stopped immediately, and the respective alarm No. is indicated under 'ALARM' in the control display mode of the copier's service mode.

Corona wire cleaner	Alarm No.
Primary corona wire cleaner	61
Transfer/Separation corona wire cleaner	62
Both of above	63

Table 3-14

To clear alarms caused by the detection mechanism, enter the user mode (* 11 OK) and execute automatic cleaning of the corona wire; the alarms cannot be cleared by switching the copier OFF and ON.

Note:
The corona cleaning motor is controlled so that it will not go ON unless the alarm, if any, is cleared; copies, however, can still be made without clearing the alarm.

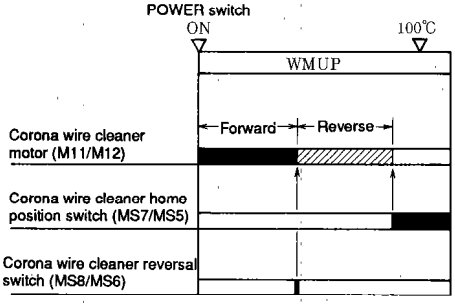

Figure 3-72

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V. PICK-UP/FEEDER SYSTEM

A. Outline

The presence of a cassette or the presence/absence of paper inside the cassette set in the cassette holder (1st/2nd cassette) are checked by switches (CST1, CST2) attached in the cassette holder; four switches are attached to each holder.

The copy paper in the cassette is lifted by a lifter, and the lifter is designed to stop at a specific position when detected by a photointerrupter (Q12, Q13).

The presence/absence of paper inside the cassette is checked also by a photointerrupter (Q10, Q11).

When the pick-up clutch (CL2) goes ON, the pick-up roller starts to rotate, thereby feeding a single sheet of copy paper from the cassette.

The copy paper is then controlled by the registration roller so that its leading edge and the leading edge of the image on the photosensitive drum match; it is then moved to the copy tray through the transfer, separation, feeder, fixing and delivery assemblies.

When a single overlay copy is made, the paper deflector plate is shifted up as soon as the copy paper (1st side) reaches the delivery assembly, thereby forwarding the paper to the set-back mechanism.

The copy paper (2nd side) is then controlled so that its leading edge and that of the image on the photosensitive drum match before it is forwarded to the copy tray through the transfer, separation, feeder, fixing, and delivery assemblies.

When a single two-sided copy is made, the No. 2 delivery roller starts to rotate in reverse to shift up the paper deflector plate about 0.3 sec after the copy paper (1st side) has moved past the delivery paper sensor (Q2).

The condition causes the copy paper to switch back and move into the duplexing unit; the paper (2nd side) then is handled exactly the same as overlay copies and sent to the copy tray.

The copier is equipped with a mechanism that moves the entire assembly of both No. 1 upper and lower registration rollers so that the horizontal end of each copy paper moves along the same path; see p. 3-98 for details.

The paper path has five photointerrupters which check whether the copy paper has reached or has moved past them.

For the pick-up/feeder systems of the cassette feeding unit and the paper deck pedestal, see p. 3-76 and p. 3-123, respectively.

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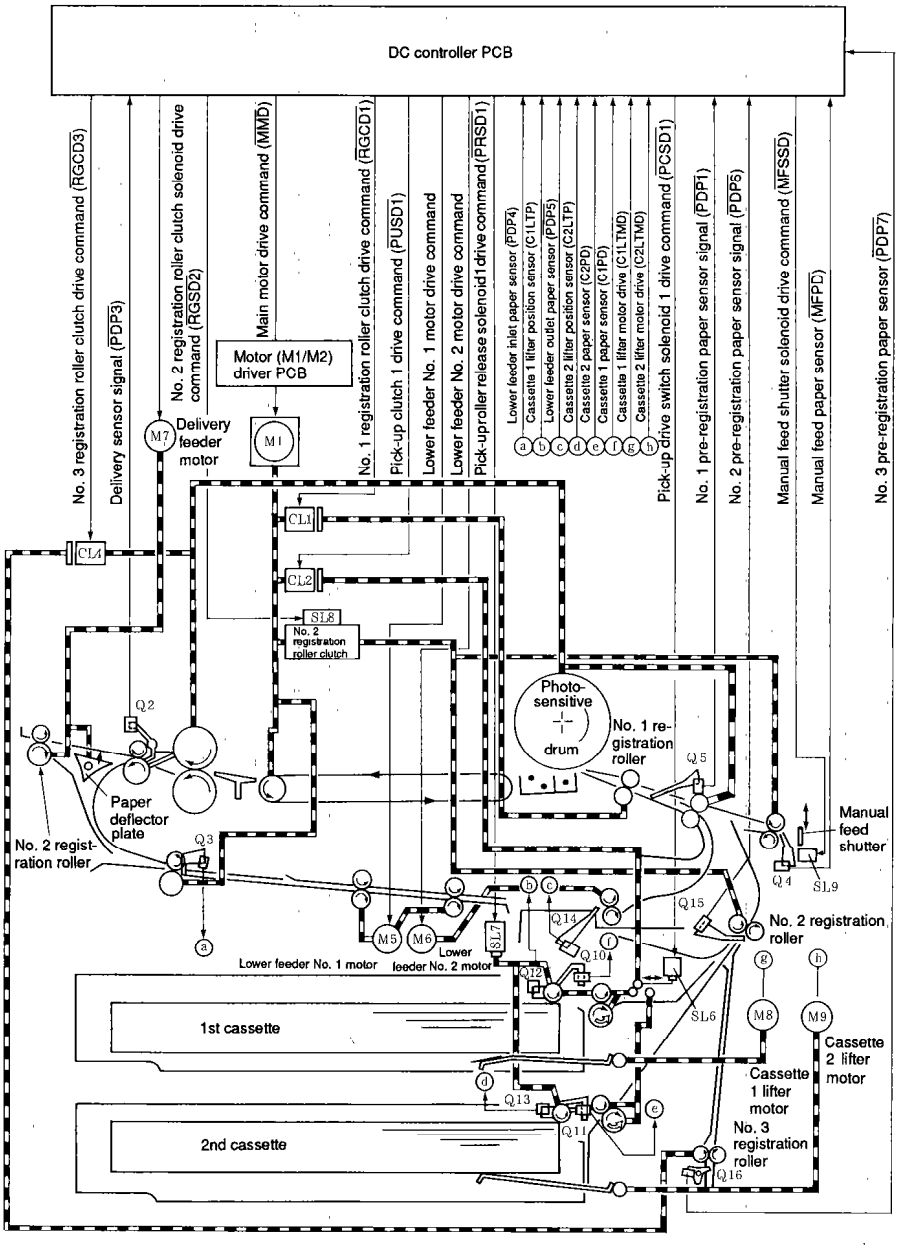

Figure 3-73

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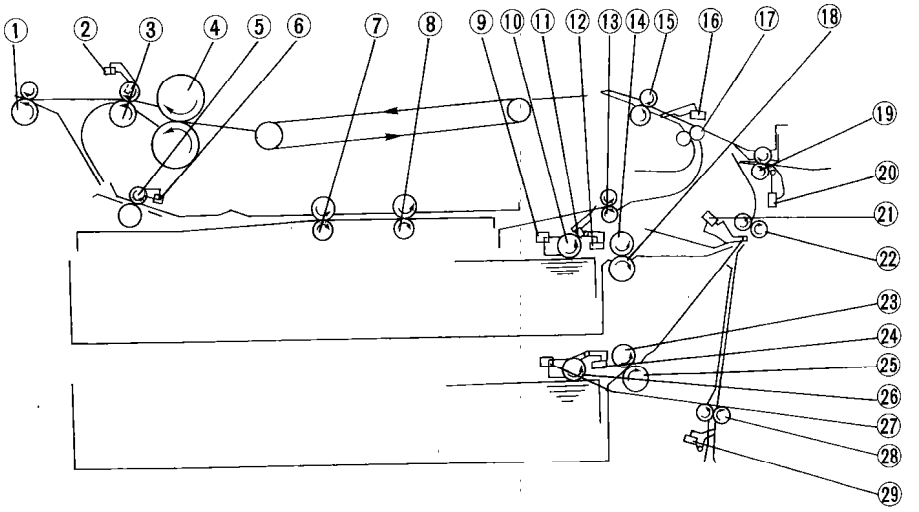
Arrangement of Rollers and Sensors (copier)



① No. 2 delivery roller
② Delivery sensor (Q2)
③ No. 1 delivery roller
④ Fixing roller
⑤ Lower feeder inlet roller
⑥ Lower feeder inlet paper sensor (Q3)
⑦ Set-back roller 1
⑧ Set-back roller 2
⑨ Cassette 1 lifter position sensor (Q12)
⑩ Cassette 1 pick-up roller
⑪ Lower feeder outlet paper sensor (Q14)
⑫ Cassette 1 paper sensor (Q10)
⑬ Lower feeder outlet roller
⑭ Cassette 1 feeder roller
⑮ No. 1 registration roller
⑯ No. 1 pre-registration paper sensor (Q5)
⑰ No. 1 pre-registration paper roller
⑱ Cassette separation roller
⑲ Manual feed pick-up roller
⑳ Manual feed paper sensor (Q4)
㉑ No. 2 pre-registration paper sensor (Q15)
㉒ No. 2 registration roller
㉓ Cassette 2 feeder roller
㉔ Cassette 2 paper sensor (Q11)
㉕ Cassette 2 separation roller
㉖ Cassette 2 pick-up roller
㉗ Cassette 2 lifter position sensor (Q13)
㉘ No. 3 registration roller
㉙ No. 3 pre-registration sensor (Q16)

Figure 3-74 Arrangement of Rollers and Sensors (copier)

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B. Identifying the Cassette Size

When a cassette is inserted into the cassette holder, specific switches become actuated.

The microprocessor identifies the presence/absence of a cassette and the size of the cassette based on the combinations shown in Table 3-15; at the same time, the microprocessor determines the count mode, reversal position for the scanner, and control method for blank exposure.

Arrangement / Cassette size	SW 701 (left)	SW 702	SW 703	SW 704 (right)
No cassette	0	0	0	0
B5 (182x257)	0	0	0	1
* U-L2 (203 to 220x317 to 354)	0	0	1	0
A4 (210x297)	0	0	1	1
B5R (257x182)	0	1	0	0
B4 (364x257)	0	1	0	1
A4R (297x210)	0	1	1	0
A3 (420x297)	0	1	1	1
* U-S1 (190 to 279x190 to 279)	1	0	0	0
* U-S2 (190 to 279x190 to 279)	1	0	0	1
* U-L1 (203 to 220x317 to 354)	1	0	1	0
Letter 8.5"x11" (216x279)	1	0	1	1
STMT 5.5"x8.5" (216x140)	1	1	0	0
Legal 8.5"x14" (356x216)	1	1	0	0
Letter R 8.5"x11" (279x216)	1	1	1	0
Ledger 11"x17" (432x279)	1	1	1	1

0: indicates SW is OFF.
1: indicates SW is ON.

* Sizes may be stored in memory within dimensions shown (in mm); see the SERVICE MODE * 5 *.

(unit: mm)

Table 3-15

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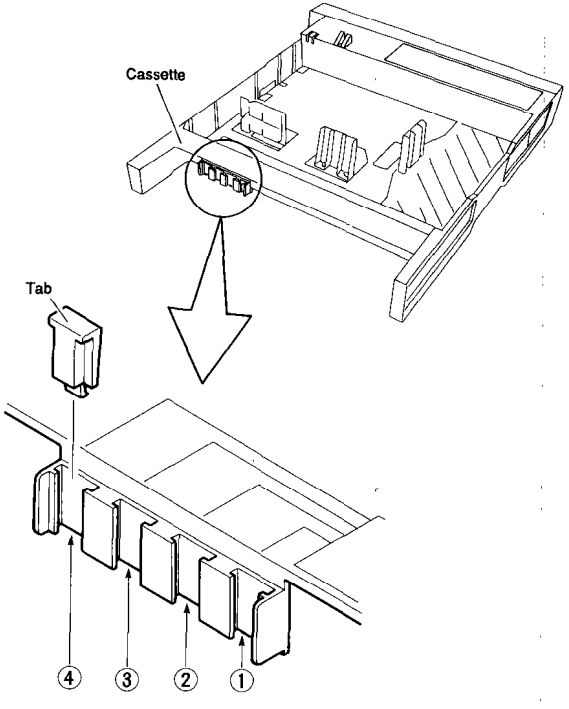
The cassette may be configured to suit specific sizes by relocating the cassette tabs shown in Figure 3-75; also, relocate the guide plate inside the cassette to suit the size of copy paper accordingly.

Note:
The location of the cassette tabs determines which copying sequence will be used; as such, incorrect location can cause frequent jams.



Copy paper size	Tab No.			
	④	③	②	①
B5	□			
U-L2		□		
A4	□	□		
B5-R			□	
B4	□		□	
A4-R		□	□	
A3	□	□	□	
U-S1				□
U-S2	□			□
U-L1		□		□
LTR	□	□		□
STMT			□	□
LGL	□		□	□
LTR-R		□	□	□
11"×17"	□	□	□	□

□····· *tab present.*

Figure 3-75 Changing the Cassette Size

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C. Pick-Up from Cassette (1st/2nd cassette)

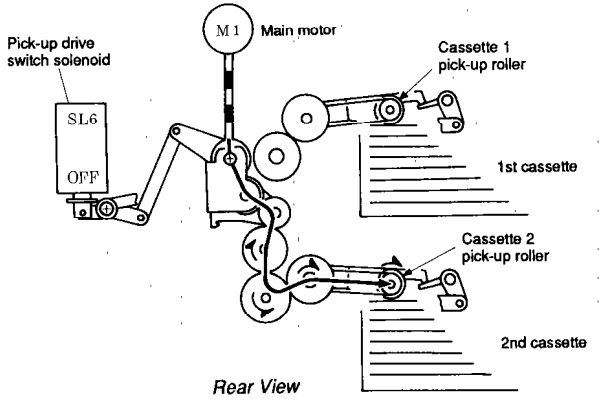
When pick-up clutch 1 (CL2) goes ON, the drive from the main motor (M1) is transmitted to the No. 1 cassette or the No. 2 casette by the work of the pick-up drive switch solenoid (SL6).

Both No. 1 and No. 2 cassettes each have a lifter motor (M8, M9) that moves up the lifter to a specific position as long as a cassette is present and the machine is supplied with power.

The presence/absence of copy paper inside the cassette is checked by photointerrupters (Q10, Q11); the position of the lifter is checked by photointerrupters (Q12, Q13).

If the photointerrupter (Q10, Q11) does not detect paper, the DC controller PCB decides that no paper is present, and the 'ADD PAPER' message will be indicated.

Pick-Up from 2nd Cassette



Pick-Up from 1st Cassette

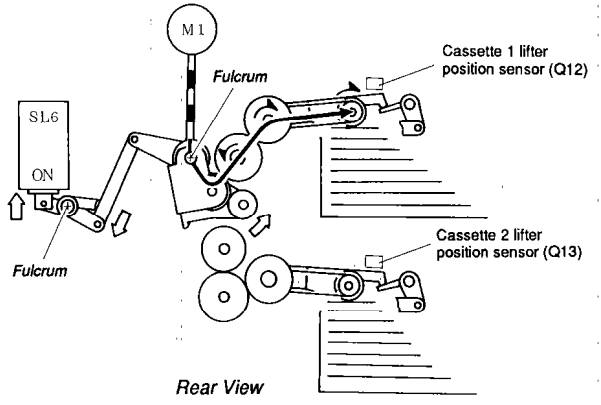


Figure 3-76 Pick-Up from 1st/2nd Cassette (transmission of drive)

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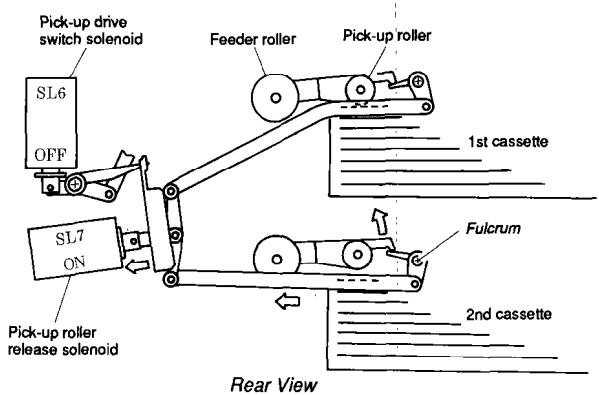
When the cassette starts to run out of copy paper during copying operation and, as a result, the lifter position signal goes '0', the lifter motor goes ON to move up the lifter to a specific position; the lifter is moved up until the lifter position sensor goes '1'.

If the lifter position sensor signal remains '0' after the lifter motor has remained ON for a specific period of time, the 'ADD PAPER' message will be indicated on the display.

The pick-up roller for cassette pick-up operation is linked to the feeder roller.

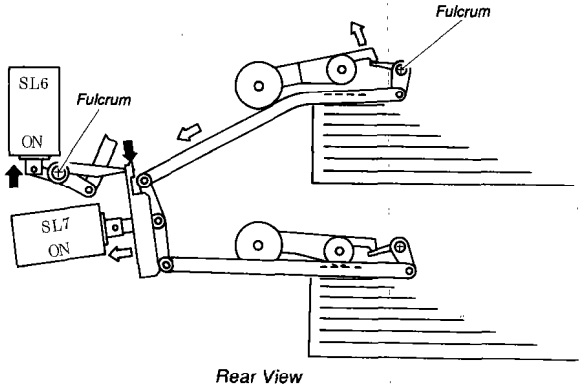
After each pick-up, the pick-up roller release solenoid (SL7) goes ON to move up the pick-up roller; this is to prevent the pick-up roller from picking up the next sheet of copy paper.

With Pick-Up Roller for 2nd Cassette Released



Rear View

With Pick-Up Roller for 1st Cassette Released



Rear View

Figure 3-77

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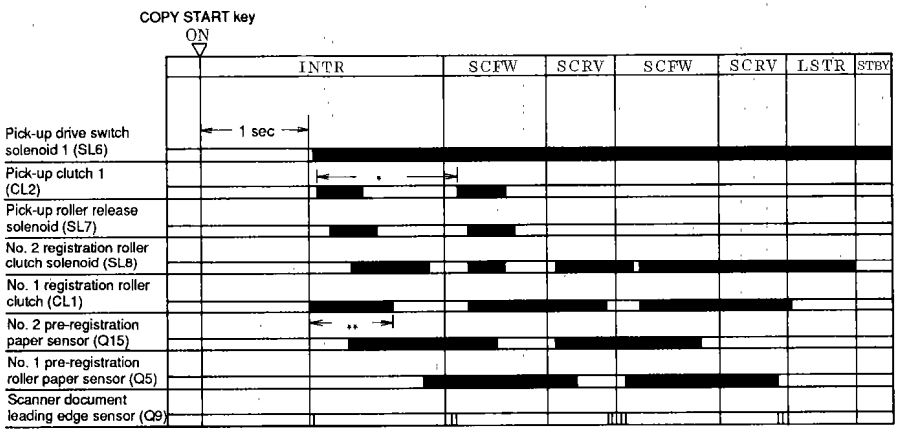

*Varies depending on the length of paper; $\frac{\text{paper (i) x } 4/3}{240 \text{ mm/s (ii)}} + 300 \text{ ms (iii)}$

i. If 216 mm or less, 216 mm.
ii. Feed speed.
iii. Warm-up time of scanner.

**Setting the No. 1 registration roller at the home position (horizontal; see p. 3-98.)

Figure 3-78 A4, 2 Copies, DIRECT, One-Sided Document to One-Sided Copy, Pick-Up from 1st Cassette

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D. Pick-Up from Cassette Feeding Unit (3rd/4th cassette)

1. Mechanism

When pick-up clutch 2 (CL801) goes ON, the drive of the pick-up motor (M803) is transmitted to the 3rd or 4th cassette by the work of pick-up drive switch solenoid 2 (SL805).

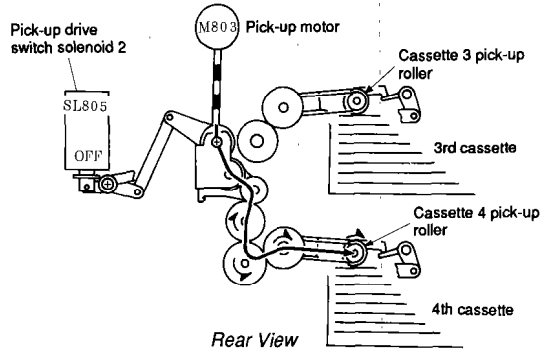
Both 3rd and 4th cassettes each have a lifter motor (M801, M802) which moves up the lifter to a specific point when a cassette is slid in while the machine is powered.

At the time, photointerrupters (Q850, Q852) are used to check the presence/absence of copy paper inside the cassette.

The position of the lifter is checked also by a photointerrupter (Q851, Q853).

If the photointerrupter (Q850, Q852) does not detect paper, the DC controller PCB identifies the absence of paper and indicates the "ADD PAPER' message.

Pick-Up from 4th Cassette



Pick-Up from 3rd Cassette

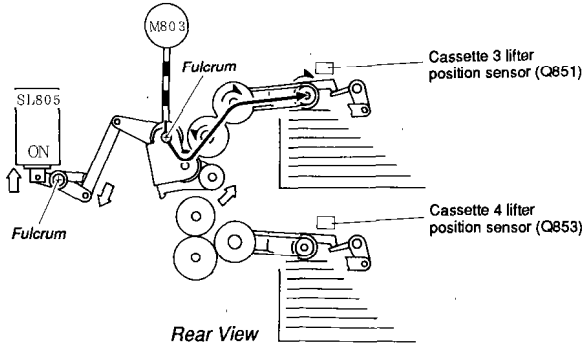


Figure 3-79 Pick-Up from 3rd/4th Cassette (transmission of drive)

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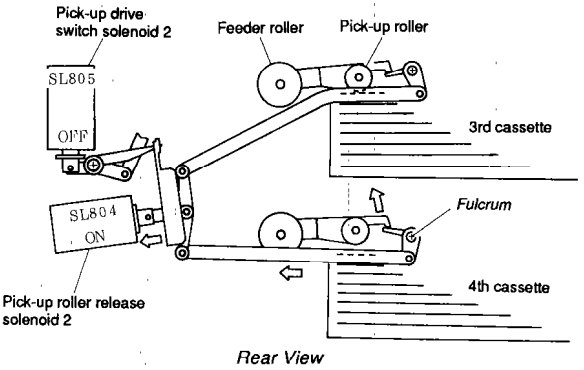
When the cassette runs out of copy paper during copying operation and the lifter position sensor signal goes '0', the lifter motor goes ON to move up the lifter to a specific position; the lifter is moved up until the lifter position sensor signal goes '1'.

If the lifter position sensor signal remains '0' after the lifter motor has remained ON for a specific period of time, the 'ADD PAPER' message is indicated on the display.

The pick-up roller of the cassette feeding unit is linked to the feeder roller.

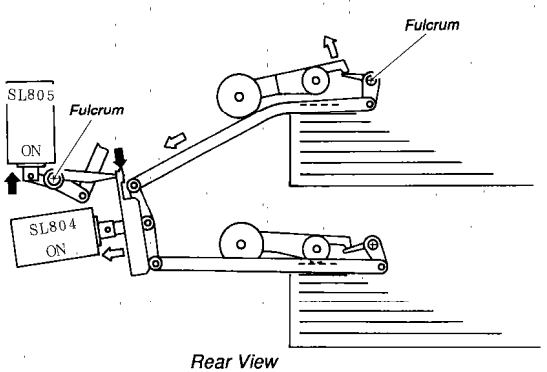
After each pick-up, pick-up roller solenoid 2 (SL804) goes ON to lift the pick-up roller; this is to prevent the pick-up roller from picking up the next sheet of copy paper at the time.

With Pick-Up Roller for 4th Cassette Released



Rear View

With Pick-Up Roller for 3rd Cassette Released



Rear View

Figure 3-80

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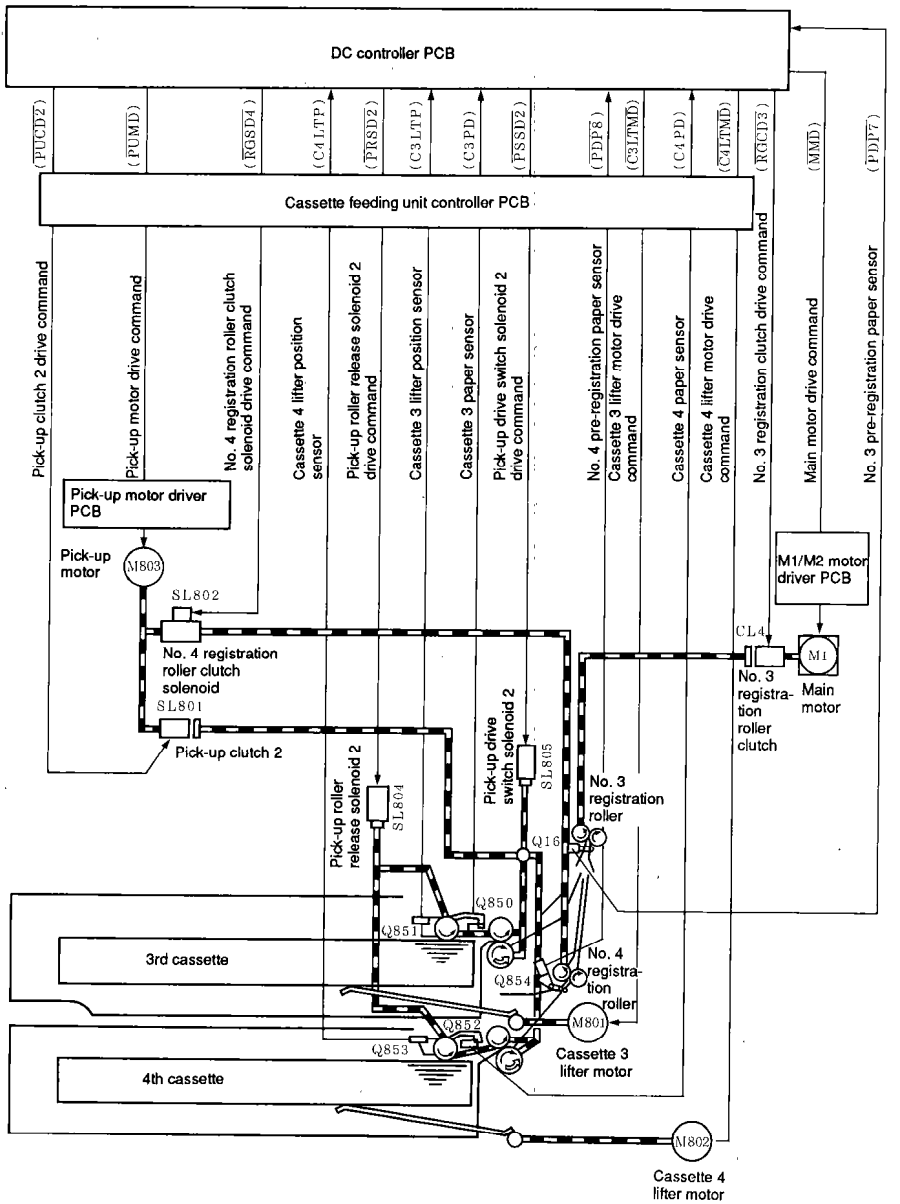

The No. 3 registration roller and CL4 are on the copier side.

Figure 3-81

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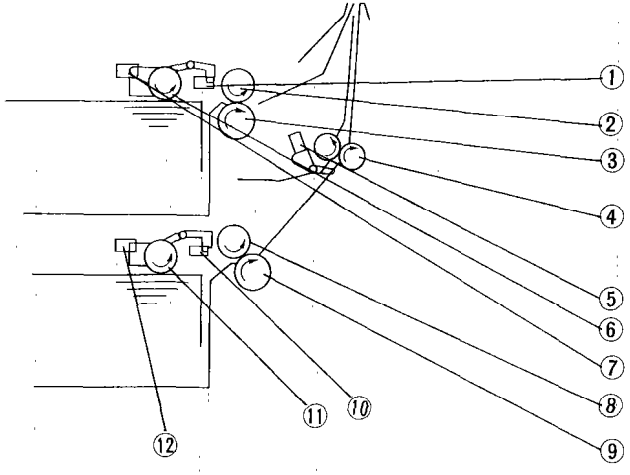
Arrangement of Rollers and Sensors (cassette feeding unit)



① Cassette 3 paper sensor (Q850)
② Cassette 3 feeder roller
③ Cassette 3 separation roller
④ No. 4 registration roller
⑤ No. 4 pre-registration paper sensor (Q854)
⑥ Cassette 3 pick-up roller
⑦ Cassette 3 lifter position sensor (Q851)
⑧ Cassette 4 feeder roller
⑨ Cassette 4 separation roller
⑩ Cassette 4 paper sensor (Q852)
⑪ Cassette 4 pick-up roller
⑫ Cassette 4 lifter position sensor (Q853)

Figure 3-82 Arrangement of Rollers and Sensors (cassette feeding unit)

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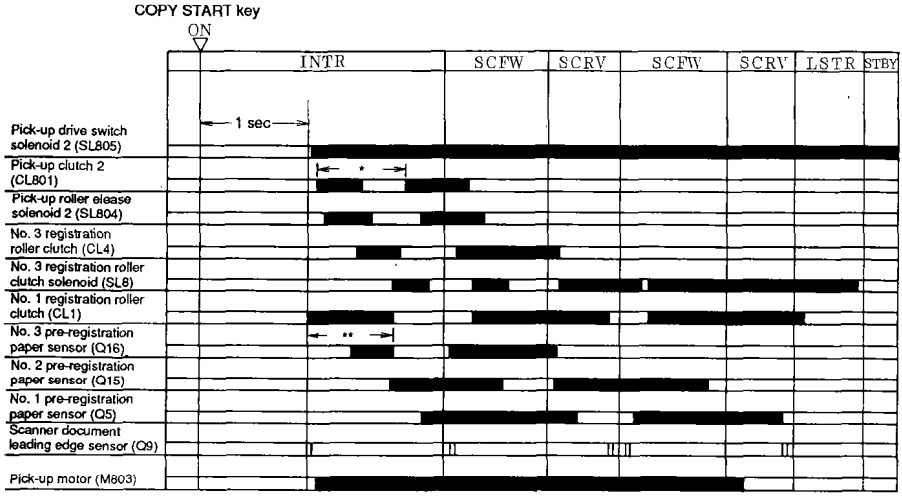

*Varies depending on the length of paper; $\frac{\text{paper (i) x 4/3}}{\text{240 mm/s (ii)}}$ + 300 ms (iii)

i. If 216 mm or less, 216 mm.
ii. Feed speed.
iii. Warm-up time of scanner.

**Setting the No. 1 registration roller at the home position (horizontal; see p. 3-98).

Figure 3-83 A4, 2 Copies, DIRECT, One-Sided Document to One-Sided Copy, Pick-Up from 3rd Cassette

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4. Pick-Up Motor Control

a. Outline

Figure 3-84 shows the circuit that controls the pick-up motor (M803), and the circuit has the following functions:

① Turns the pick-up motor ON and OFF.

② Maintains the pick-up motor rotation constant.

The pick-up motor (M803) is a 3-phase DC motor.

b. Mechanism

When the pick-up motor drive command (PUMD) from the cassette feeding unit controller circuit goes '0', the control circuit causes the pulse signals U, V, and W to go ON in sequence to rotate the pick-up motor; these pulses are generated based on the output of the Hall IC.

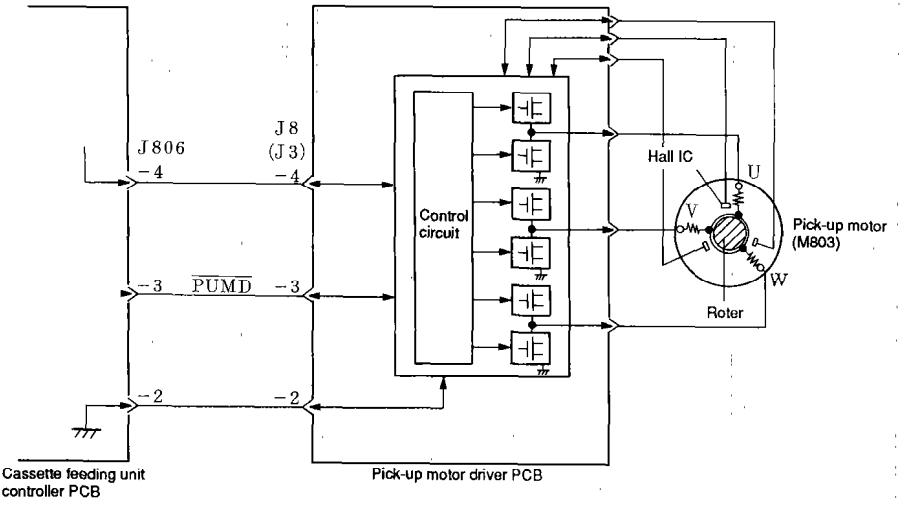

Figure 3-84

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E. Manual Feed Pick-Up

1. Manual Feed Pick-Up

The manual feed pick-up roller is driven by the main motor (M1) and rotates when the No. 2 registration roller clutch solenoid (SL8) is ON. The manual feed pick-up roller starts to rotate as soon as the manual feed paper sensor (Q4) detects copy paper.

The manual feed shutter moves up when the manual feed pick-up paper sensor (Q4) detects the trailing edge of paper to prevent the next sheet from coming in.

Further, the shutter is kept closed to prevent manual insertion of copy paper while copies are being made from a cassette.

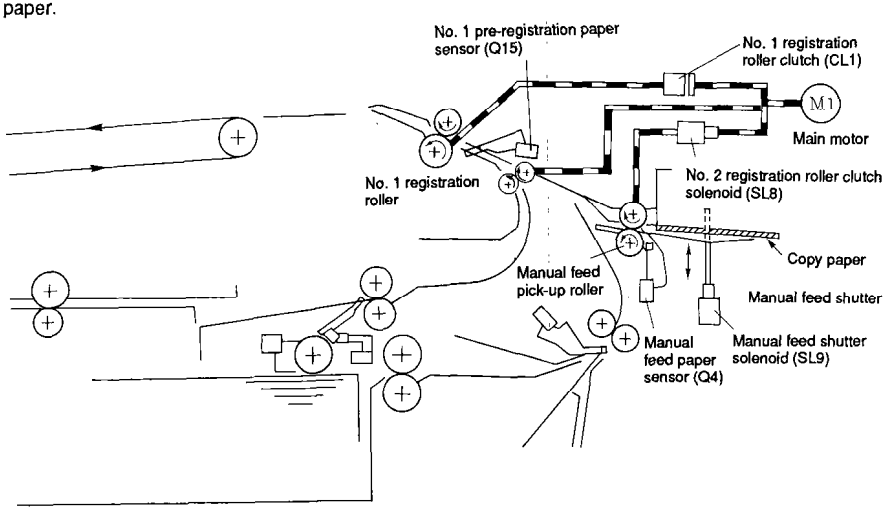
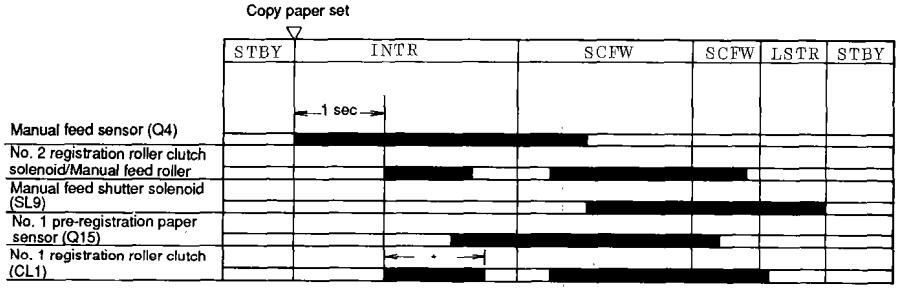

No. 1 pre-registration paper sensor (Q15)
No. 1 registration roller clutch (CL1)
M1
Main motor
No. 1 registration roller
No. 2 registration roller clutch solenoid (SL8)
Copy paper
Manual feed pick-up roller
Manual feed shutter
Manual feed paper sensor (Q4)
Manual feed shutter solenoid (SL9)

Figure 3-85



*Sets the No. 1 registration roller to the home position (horizontal).

Figure 3-86

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2. Manual Feeding for CD Unit Changer

The manual feed skew roller and the CD unit changer feeder roller are driven by the horizontal drive motor (M902).

When the CD unit changer manual feed paper sensor (Q960) remains ON for 1 sec, the manual feed skew roller solenoid (SL904) goes ON to hold the paper and, then, the manual shutter solenoid (SL905) goes ON.

The manual feed switch solenoid (SL903) is caused to go ON when the horizontal drive motor (M902) is switched between forward and reverse rotations to engage the gears to transmit the drive to the rollers, thereby forwarding the paper into the machine.

The paper that has moved to the manual feed sensor (Q4) inside the machine is then moved forward according to the sequence shown in Figure 3-88.

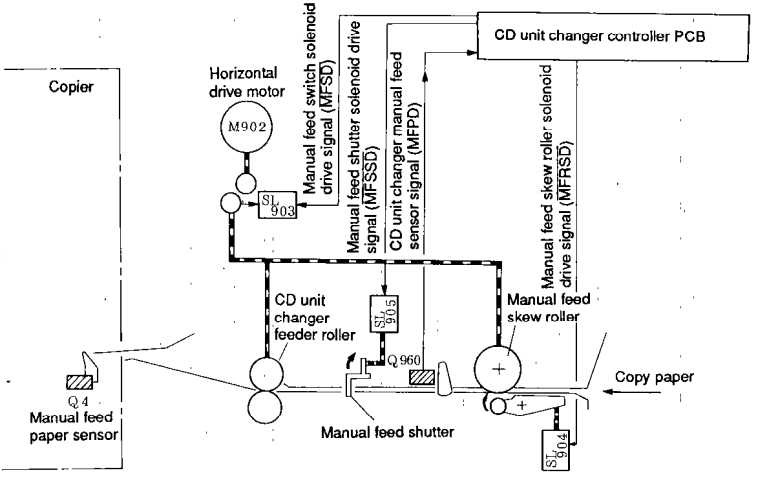

Figure 3-87

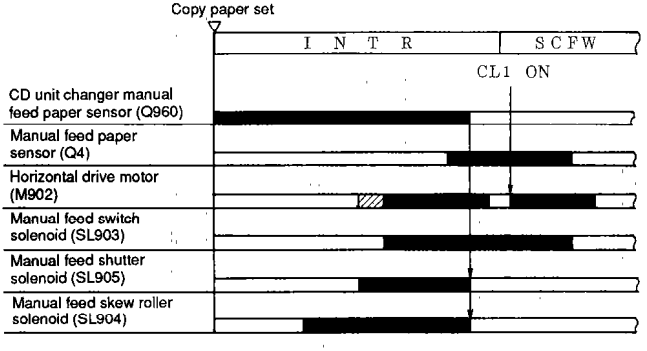
Copy paper set
I N T R
S C F W
CL1 ON
CD unit changer manual feed paper sensor (Q960)
Manual feed paper sensor (Q4)
Horizontal drive motor (M902)
Manual feed switch solenoid (SL903)
Manual feed shutter solenoid (SL905)
Manual feed skew roller solenoid (SL904)

Figure 3-88

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F. Making a Single Overlay Copy

1. Outline

When copying on the 1st side of a single overlay copy, the paper deflector plate is shifted up as soon as the copy paper reaches the delivery assembly; i.e., the delivery feeder motor (M7) starts to rotate in reverse. The paper is then forwarded to the lower feeder assembly by the paper deflector plate.

Thereafter, the copy paper butts against set-back roller 1 and forms an arch; it then moves past set-back roller 2 and to the lower feeder outlet roller.

The copy paper stops several millimeters past the lower feeder outlet roller to wait for copying on its second side. The paper deflector is then shifted down in preparation for the delivery of the paper.

Note:

i The duplex unit feeder inlet roller is equipped with a mechanism that improves separation of copy paper around the photosensitive drum assembly at time of two-sided/overlay copying.

ii The NO. 1 pre-registration roller is used to help improve the registration of overlay images.

Copying on 1st Side

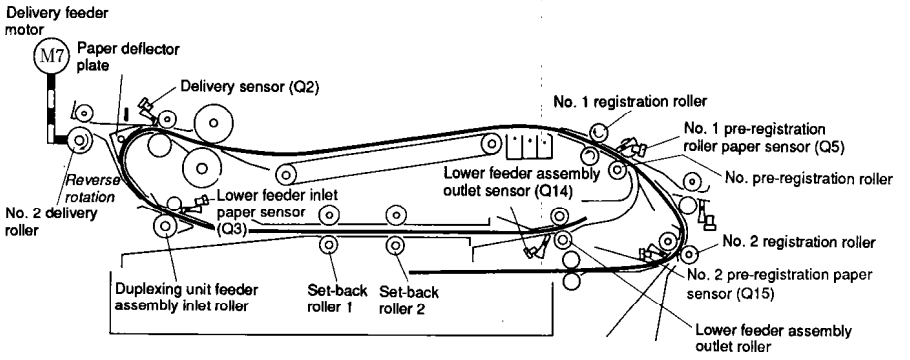
Delivery feeder motor
M7
Paper deflector plate
Delivery sensor (Q2)
No. 1 registration roller
No. 1 pre-registration roller paper sensor (Q5)
Reverse rotation
No. 2 delivery roller
Lower feeder inlet paper sensor (Q3)
Lower feeder assembly outlet sensor (Q14)
No. pre-registration roller
No. 2 registration roller
No. 2 pre-registration paper sensor (Q15)
Duplexing unit feeder assembly inlet roller
Set-back roller 1
Set-back roller 2
Lower feeder assembly outlet roller

Figure 3-89

Copying on 2nd Side

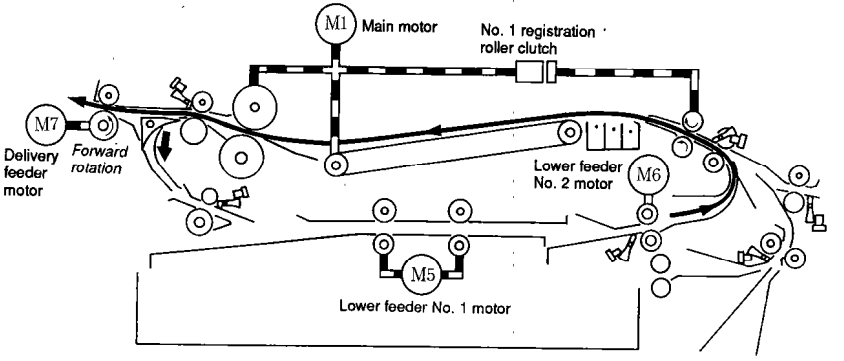

Figure 3-90

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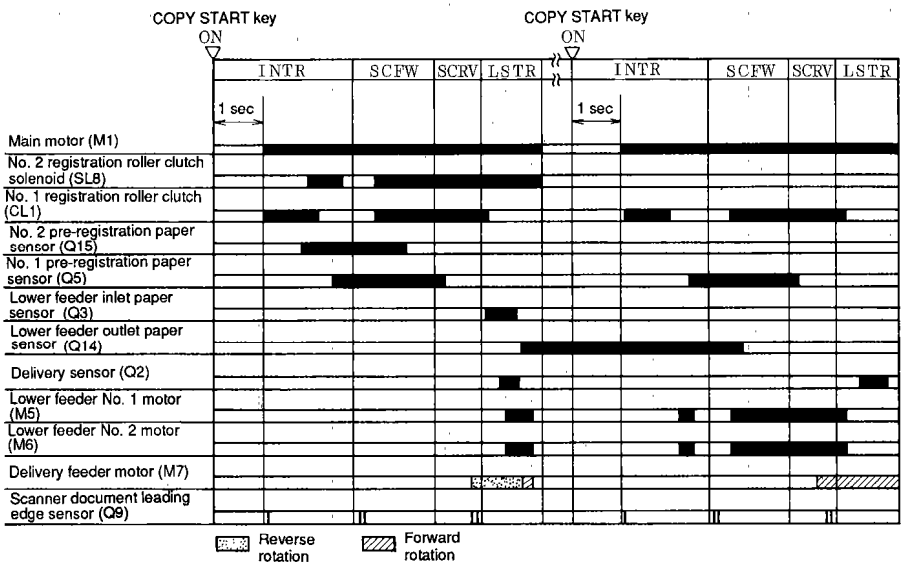

Figure 3-91 A4 (LTR), 1 Copy, DIRECT, Overlay, Pick-Up form 1st Cassette

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G. Making a single Two-Sided Copy

1. Outline

When the 1st side of a two-sided copy has been fixed and the trailing edge of the copy paper has moved past the delivery sensor (Q2), the No. 2 delivery roller starts to move in reverse to shift up the paper deflector plate, causing the copy paper to switch back and move to the lower feeder assembly.

The copy paper then stops several millimeters past the lower feeder outlet roller to wait for copying on the 2nd side. The paper deflector plate is then shifted down in preparation for the delivery of the copy paper.

Copying on 1st Side

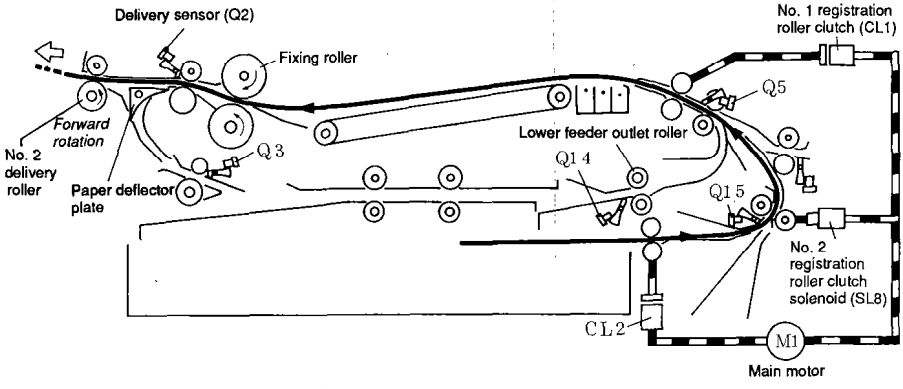

Figure 3-92

Copying on 1st Side (switch-back)

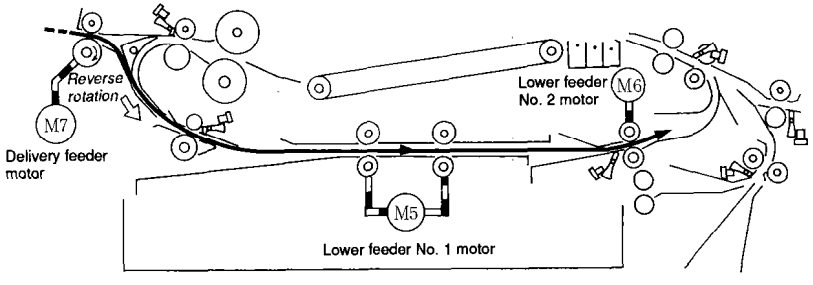

Figure 3-93

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Copying on 2nd Side

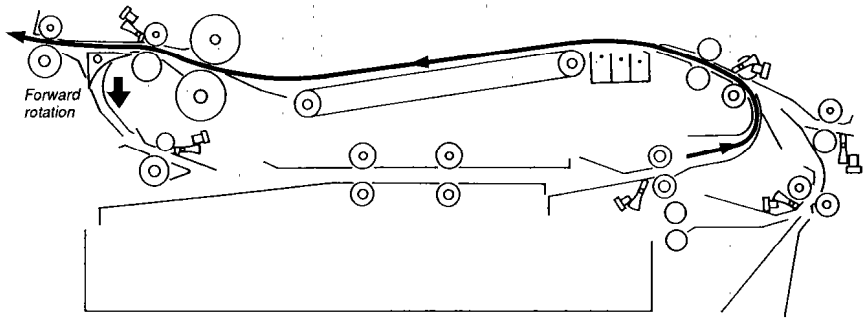

Figure 3-94

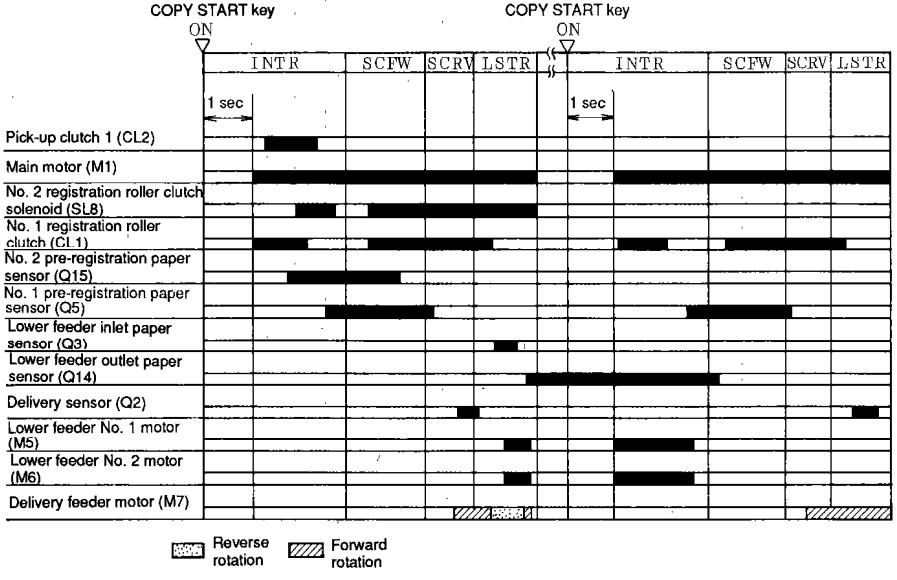

Figure 3-95 A4 (LTR), 1 Copy, DIRECT, Two-Sided, Pick-Up from 1st Cassette

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H. Set-Back Mechanism

1. Outline

The copier uses its set-back mechanism to execute continuous copying in the two-sided mode and the overlay mode.

In the set-back mechanism, sheets of copy paper are stacked up in the lower feeder assembly to save space without causing double feeding.

The set-back mechanism is activated under the following conditions:

i. Copy Paper Size
   feeding direction: 182 mm to 216 mm
   across drum (axial): 257 mm to 297 mm
ii. 2 or more copies, up to 20 copies (COPY START key not enabled thereafter)

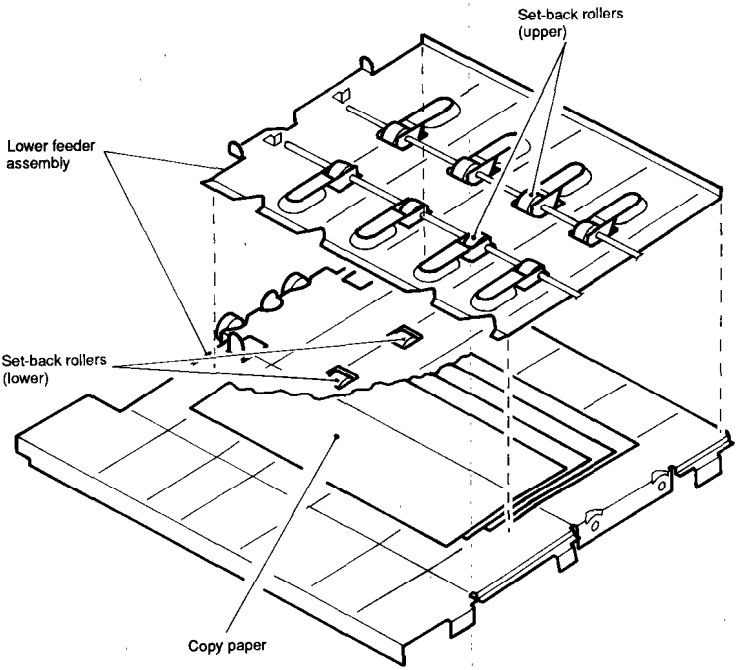

Figure 3-96

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2. Two-Sided/Overlay Copy (1st side)

The set-back mechanism works as shown in below when two two-sided/overlay copies of A4 (LTR) size are made. The lower feeder inlet roller is driven by the main motor (M1), the set-back roller by the lower feeder No. 1 motor (M5), and the lower feeder outlet roller by the lower feeder No. 2 motor (M6).

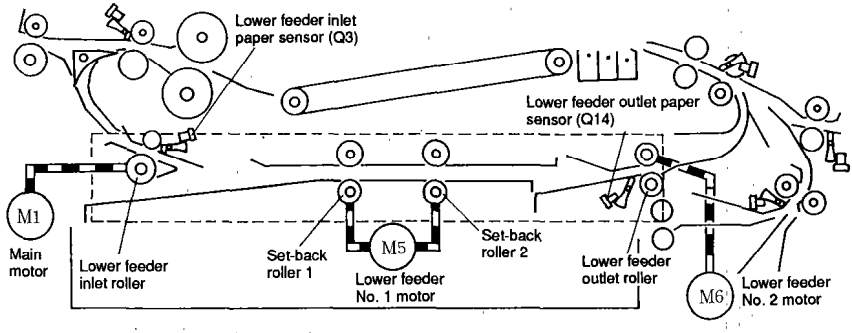

Figure 3-97

1) The first copy paper is sent tot the lower feeder assembly after copying on its 1st side and is made to butt against set-back roller 1 to form an arch.

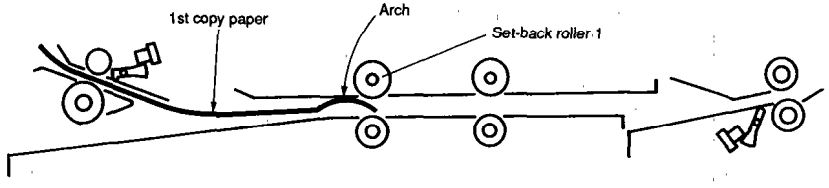

Figure 3-98

2) The first copy paper is moved forward and then moved past the lower feeder inlet paper sensor (Q3).

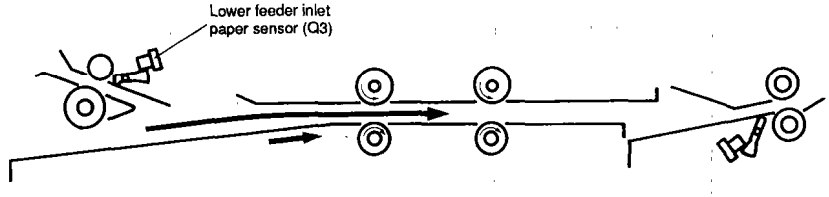

Figure 3-99

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3) Set-back rollers 1 and 2 are rotated in reverse, and the first copy paper is stopped 10 mm from set-back roller 1.

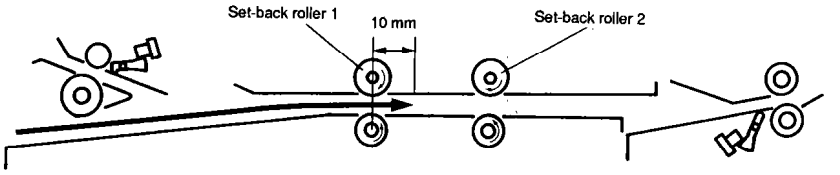

Figure 3-100

4) The second copy paper butts against set-back roller 1 to form an arch after copying on its 1st side.

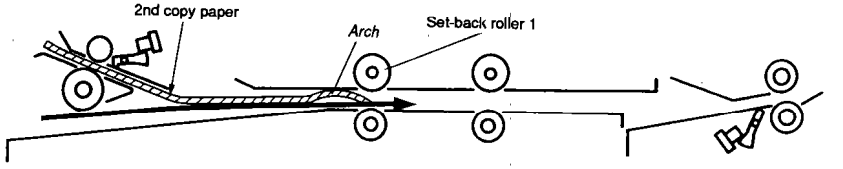

Figure 3-101

5) The first copy paper and the second copy paper are moved forward, and the second copy paper is moved past the lower feeder inlet sensor (Q3).

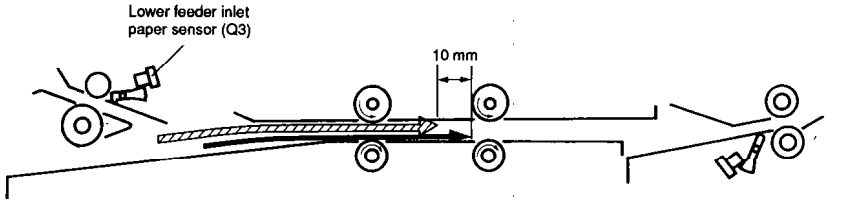

Figure 3-102

6) Set-back rollers 1 and 2 are rotated in reverse, and the second copy paper is stopped 10 mm from set-back roller 1.

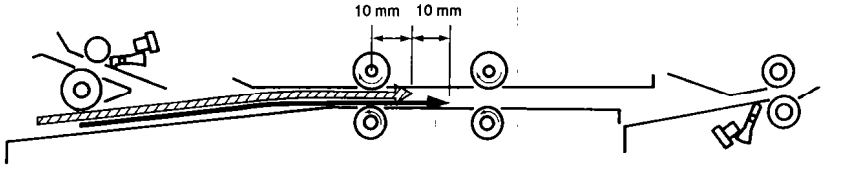

Figure 3-103

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7) When all sheets have been stacked, the set-back roller is rotated forward, and the copy paper is moved until the the lower feeder outlet sensor (Q14) detects the leading edge of the first copy paper.

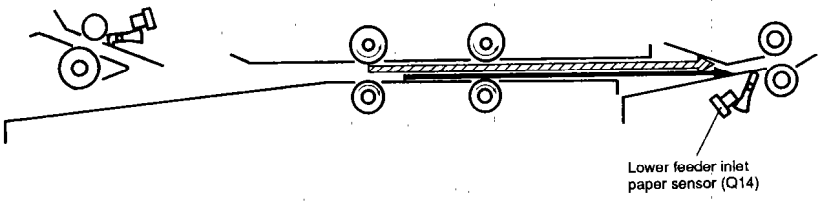
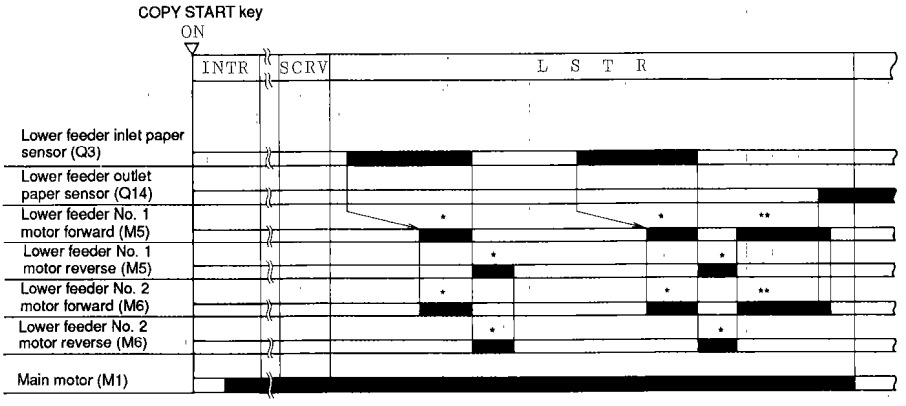


Figure 3-104


COPY START key
ON
INTR
SCRV
L S T R
Lower feeder inlet paper sensor (Q3)
Lower feeder outlet paper sensor (Q14)
Lower feeder No. 1 motor forward (M5)
Lower feeder No. 1 motor reverse (M5)
Lower feeder No. 2 motor forward (M6)
Lower feeder No. 2 motor reverse (M6)
Main motor (M1)

*Varies depending on the length of copy paper.
**Varies depending on the number of sheets.

Figure 3-105 A4, 2 Copies, DIRECT, Two-Sided/Overlay Copy (sequence up to lower feeder assembly)

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3. Overlay Copy (pick-up; 2nd side)

Copying is finished on the 1st side of the first copy paper and the second copy paper; after a set-back operation, the following operations take place:

1) Set-back rollers 1 and 2 are rotated in reverse, and the leading edge of the first copy paper after a set-back is moved back several millimeters in front of the lower feeder outlet paper sensor (Q14).

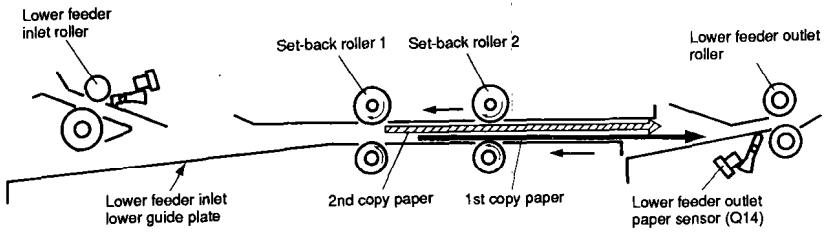
Lower feeder inlet roller
Set-back roller 1
Set-back roller 2
Lower feeder outlet roller
Lower feeder inlet lower guide plate
2nd copy paper
1st copy paper
Lower feeder outlet paper sensor (Q14)

Figure 3-106

2) Set-back rollers 1 and 2 together with the lower feeder outlet roller move the first copy paper about 54 mm* in the direction of the arrow (Figure 3-107) until the first copy paper moves past set-back roller 2.
   * Varies depending on the size of the paper.
   paper length – 158 mm (between set-back roller 2 and lower feeder outlet sensor) + 20 mm (leeway)

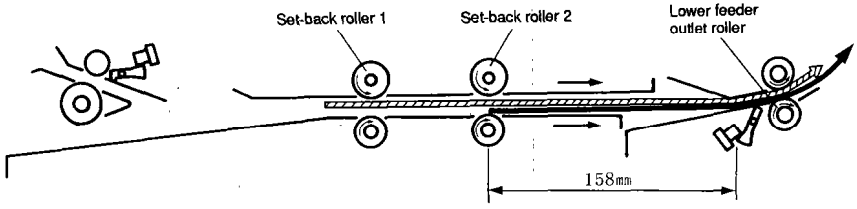

Figure 3-107

3) While rotating the lower feeder outlet roller in the direction of the arrow (Figure 3-108), set-back rollers 1 and 2 are rotated in reverse to separate the first copy paper and the second copy paper.

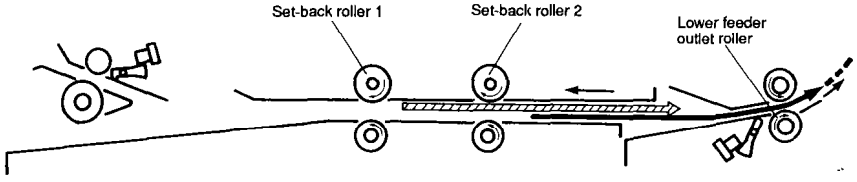

Figure 3-108

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4) The second copy paper is stopped when its leading edge has moved back several millimeters from the lower feeder outlet sensor; the first copy paper is forwarded to the No. 1 registration roller.

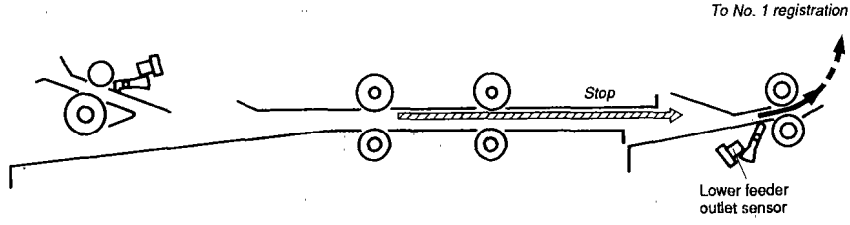

Figure 3-109

5) After the first copy paper is detected by the No. 1 pre-registration roller sensor, the second copy paper is moved by set-back roller 2 and the lower feeder outlet roller until it moves past set-back roller 2.

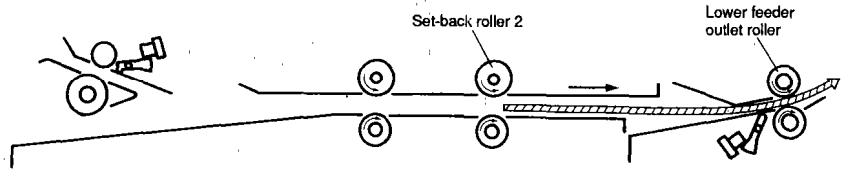

Figure 3-110

6) Thereafter, the second copy paper is moved to the No. 1 registration roller by the lower feeder outlet roller.

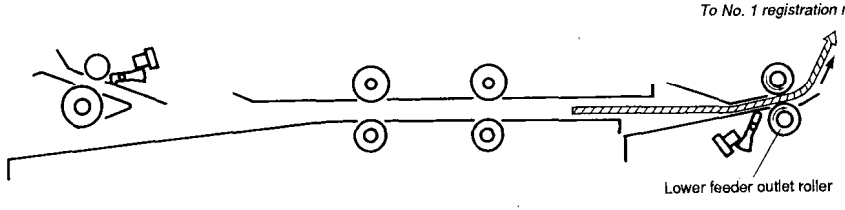

Figure 3-111

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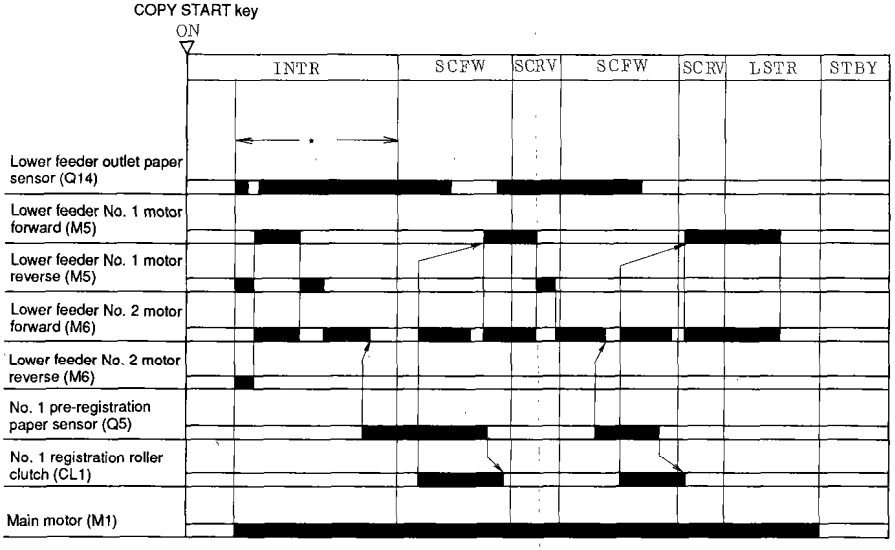

* While copy paper is being, fed, (scanner in wait).

Figure 3-112 A4, 2 Copies, DIRECT, Overlay Copy (pick-up from duplexing unit feeder assembly)

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4. Two-Sided Copy (2nd side)

Copying is finished on the 1st side of the first copy paper and the second copy paper; after a set-back operation, the following operations take place:

1) Set-back rollers 1 and 2 are rotated in reverse, and the leading edge of the first copy paper after a set-back is moved back several millimeters in front of the lower feeder outlet paper sensor (Q14).

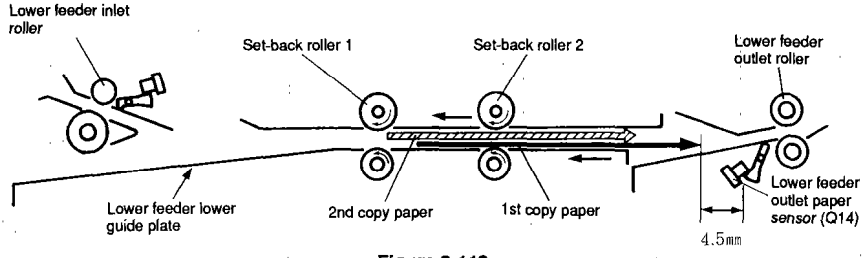

Figure 3-113

2) Set-back rollers 1 and 2 and the lower feeder outlet roller are rotated in the direction of the arrow (Figure 3-114) about an equivalent of 54 mm* until the first copy paper moves past set-back roller 2.
   * Varies depending on the size of the paper.
   paper length - 158 mm (between set-back roller 2 and lower feeder outlet sensor) + 20 mm (leeway)

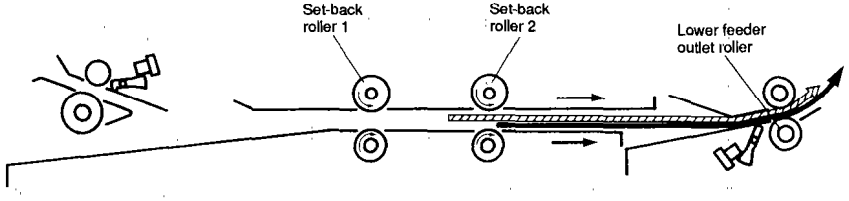

Figure 3-114

3) With the lower feeder outlet roller at rest, set-back rollers 1 and 2 are rotated in reverse to move the second copy paper past the lower feeder outlet roller.

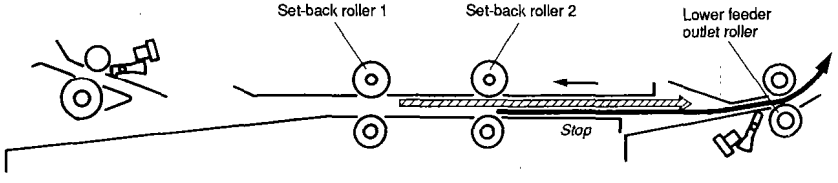

Figure 3-115

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4) The second copy paper is stopped when its leading edge moves back several millimeters from the lower feeder outlet paper sensor (Q14).

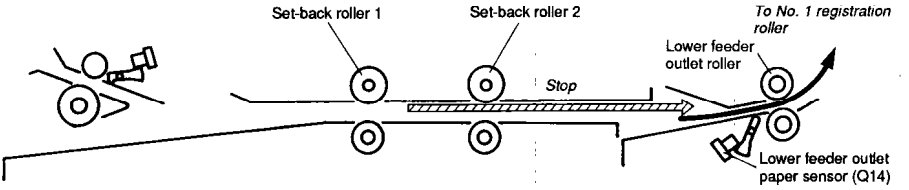

Figure 3-116

5) When the No. 1 pre-registration roller paper sensor (Q5) detects the first copy paper, set-back roller 2 and the lower feeder outlet roller move the second copy paper until it moves past set-back roller 2.

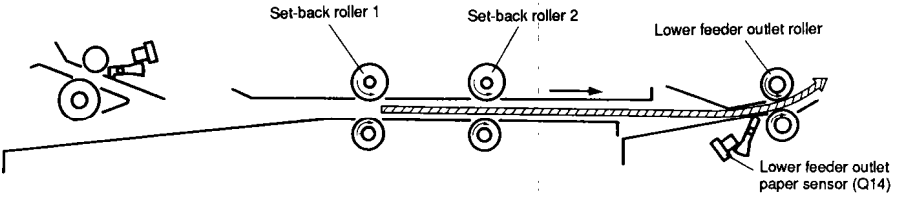

Figure 3-117

6) Thereafter, the second copy paper is moved to the No. 1 registration roller by the lower feeder outlet roller.

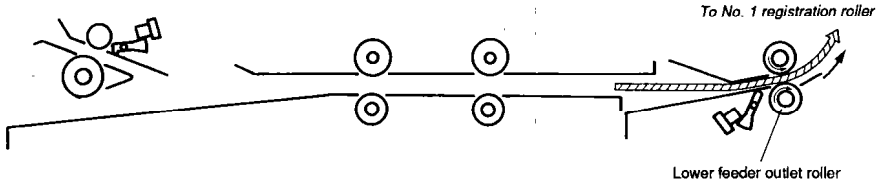

Figure 3-118

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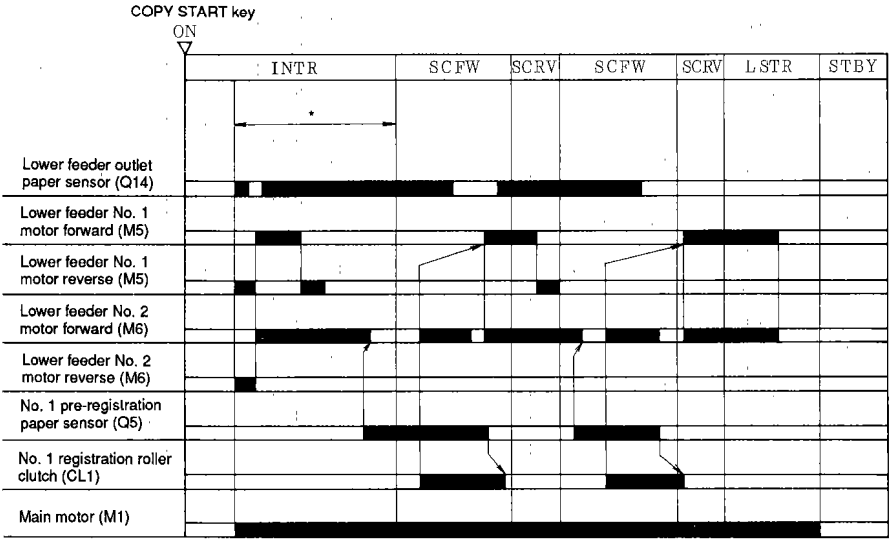

* While copy paper is being fed (scanner is wait).

Figure 3-119 A4, 2 Copies, DIRECT, Two-Sided Copy (pick-up from lower feeder assembly)

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I. Moving the No. 1 Registration Roller Horizontally

1. Outline

The copier moves the No. 1 registration roller sideways for each copy for the following:

a. to match the image horizontal edge on the photosensitive drum with the edge of the copy paper.

The horizontal registration motor (M4) is a stepping motor and is used to drive the No. 1 registration roller in the horizontal (drum axial) direction.

The drive of the horizontal motor (M4) is transmitted to gear C, which is a single entity with gear B, through gears A and B.

The rotation of gear C causes the No. 1 registration roller to move sideways; see Figure 3-120.

The horizontal home position of the No. 1 registration roller is set by causing the No. 1 registration roller to move to the direction of the arrow (view A of Figure 3-120) until it butts against the stop when the COPY START key is pressed.

When the copy paper reaches the No. 1 registration roller, the horizontal registration motor (M4) goes ON, causing the No. 1 registration roller to move toward the front.

When the horizontal registration paper edge sensor (Q6) detects the edge of the copy paper, the horizontal registration motor (M4) rotates inreverse for a specific number of pulses, thereby moving the No. 1 registration roller toward the rear.

The No. 1 registration roller is always rotated when the horizontal registration motor goes ON so as to facilitate the horizontal movement of the No. 1 registration roller.

When in the manual feed mode, horizontal control of the No. 1 registration roller is not executed.

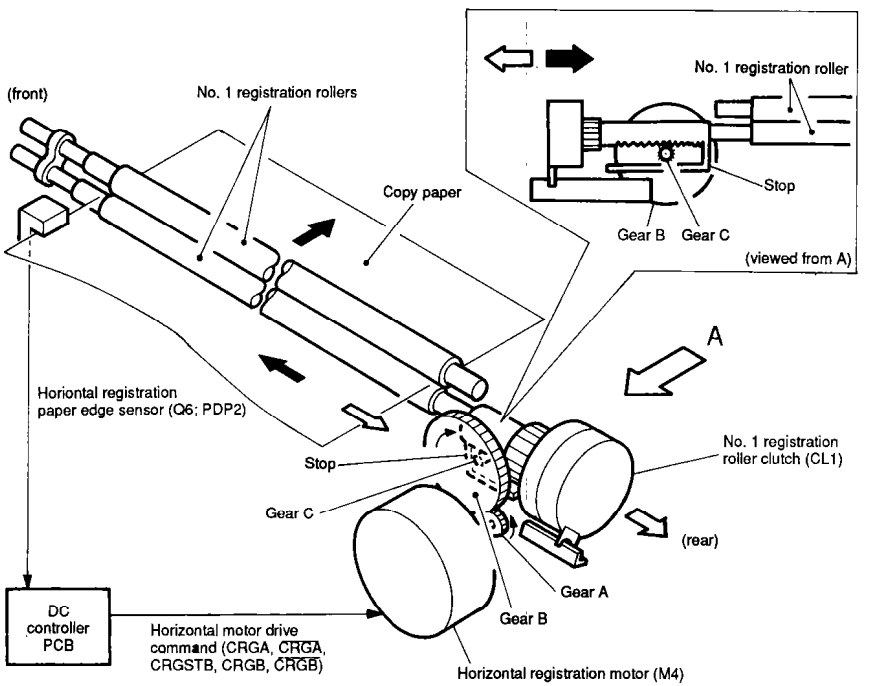

Figure 3-120

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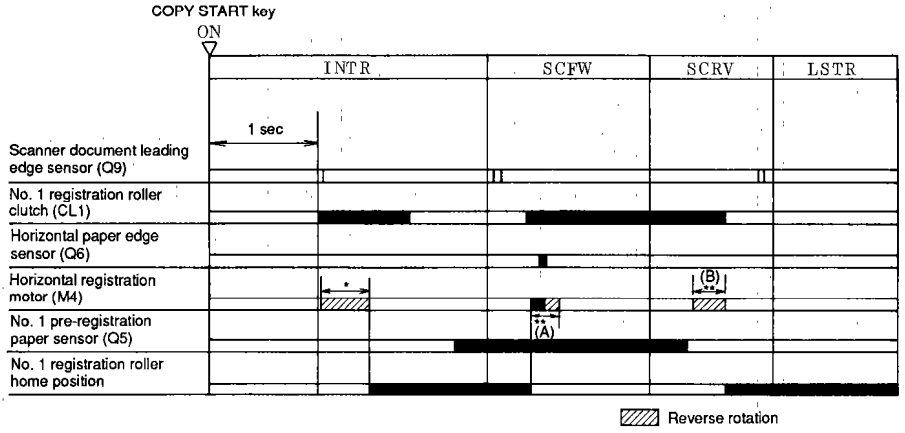

* Setting the No. 1 registration roller to the home position.

** Operation is as follows:

A: Rotated forward from when the No. 1 registration roller is at the home position until when the horizontal registration paper edge sensor (Q6) detects the copy paper and then rotated in reverse for a specific number of pulses; rotated only in reverse if Q6 detects the copy paper at the beginning of the period.

B: Rotated to move the No. 1 registration roller toward the home position over a distance equal to A above.

Figure 3-121 A4, 1 Copy, DIRECT, One-Sided Document to One-Sided Copy, Pick-Up from 1st Cassette (No. 1 registration roller horizontal movement)

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J. Fixing and Delivery Assemblies

1. Controlling the Temperature of the Fixing Roller

The upper roller, lower roller, and No. 1 delivery roller of the fixing assembly are driven by the main motor (M1).

The upper roller is heated by the fixing heater (H1; 800 W), and the temperature of its surface is monitored by a thermistor (TH1).

Fixing assembly surface temperature is high.

↳ Resistance of thermistor (TH1) is low.

↳ Voltage of fixing roller surface temperature sensor signal (FRST) is low.

Fixing assembly surface temperature is low.

↳ Resistance of thermistor (TH1) is high.

↳ Voltage of fixing roller surface temperature sensor signal (FRST) is high.

Based on the voltage of FRST, the microprocessor on the DC controller PCB controls the state of the fixing heater drive signal (HTRD; i.e., '1' and '0'), thereby maintaining the surface temperature of the upper roller at a specific value.

during standby and copying, controlled to 190°C

during preheat, controlled to 180°C

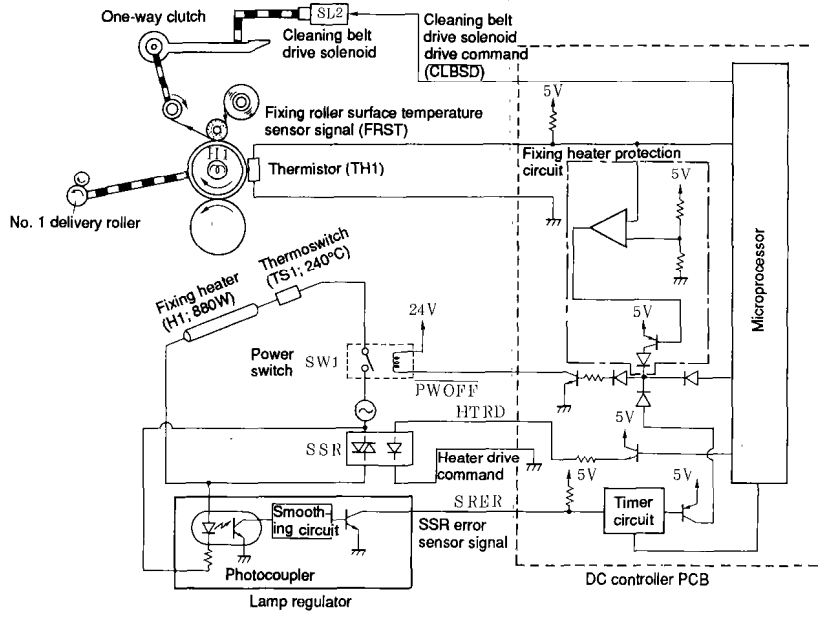

Figure 3-122

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2. Protection Mechanism

The copier is equipped with four types of protective mechanism to prevent malfunctions of the fixing heater.

a. The microprocessor monitors the voltage of the thermistor (TH1); in response to an error, it indicates 'E000', 'E001', 'E002', and 'E003' and switches the copier OFF automatically about 20 sec later.
b. If the voltage of TH1 drops to less than 1.1 V (equivalent of 225°C), the fixing heater protection circuit goes ON to turn the power switch (SW1) OFF; this occurs automatically and regardless of the output of the microprocessor.
c. If the temperature inside the thermoswitch exceeds 240°C, the thermoswitch goes OFF to cut the power to the fixing heater.
d. The DC controller circuit monitors the state of the SSR; if the SSR fails (short circuit), the SSR error sensor signal (SRER) goes '1'; the condition causes 'E004' to go ON and, after about 2 sec, the power switch (SW1) goes OFF automatically.

The power switch goes OFF 2 seconds later even if the thermoswitch is OFF or the fixing heater has gone OFF.

Note:
Once its contact is open, the thermoswitch (TS1) will not be reset unless it is cooled to 0°C or less; the contact will not recover at ambient temperature.

3. Fixing Roller Bias

A positive DC bias (750 V) is applied to the core of the upper fixing roller during copying operation.

The bias is used to limit offset to the fixing roller; the fixing roller bias is generated by the AC component of the developing bias after rectification.

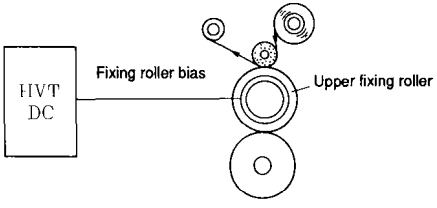

Figure 3-123

4. Moving the Cleaning Belt

The cleaning belt used to clean the upper fixing roller is driven by the cleaning belt drive signal ($\overline{CLBSD}$) generated by the DC controller; the '1' or '0' state of the signal causes the cleaning belt drive solenoid (SL2) to go ON and OFF. Each activation of the solenoid causes the belt to be taken up about 0.04mm; the number of ON and OFF states of the cleaning belt drive solenoid depends on the length of the copy paper used (Table 3-16).

The ON/OFF operation of the solenoid may be modified, in the service mode.

Length of copy paper	Cleaning belt drive solenoid (ON/OFF)
less than 216 mm	once
216 mm or more	twice

Table 3-16

Note:
In the manual feed mode, the cleaning belt drive solenoid is turned ON and OFF twice regardless of the length of the copy paper used.

The DC controller PCB counts how may times the cleaning belt drive solenoid has gone ON; when it has gone ON 300,00 times or more, it indicates the 'BELT RUNNING OUT' message on the display during copying operation. Advise the user to make a service call when the message appears. The counter may be checked and cleared in the service mode.

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5. Sequence of Operation (fixing assembly)

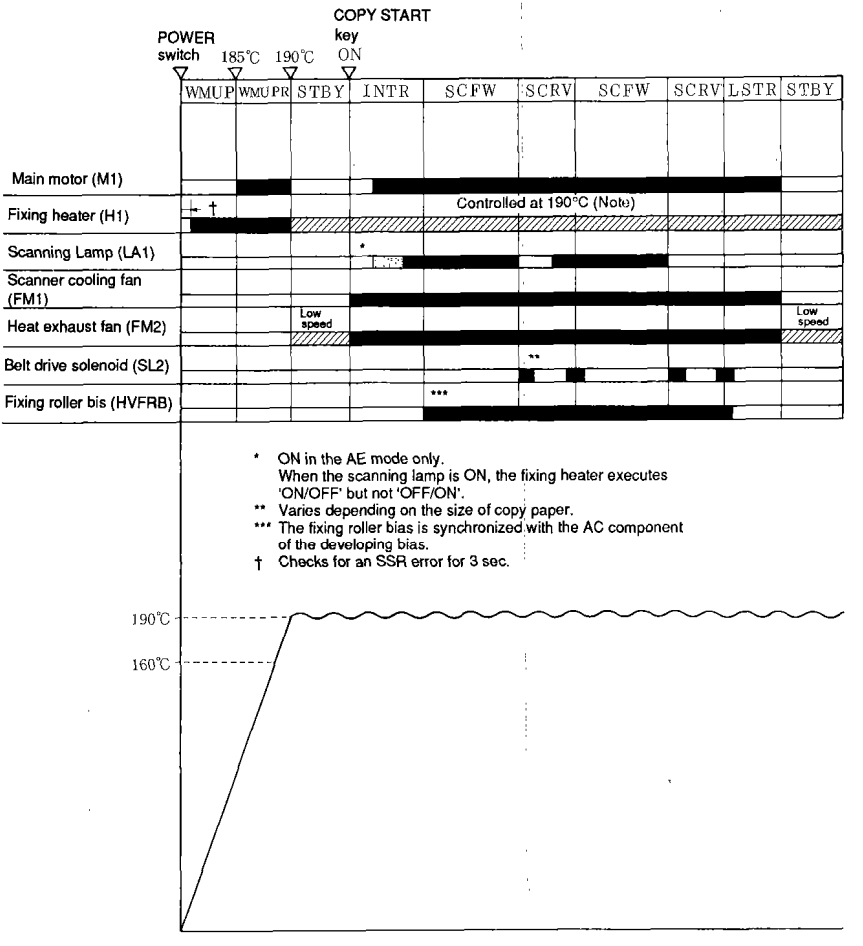

Figure 3-124

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6. Delivery Assembly

The delivery feeder motor (M7) is a 4-phase stepping motor.

As shown in Figure 3-125, gear C is driven by the delivery feeder motor. The direction of rotation and the paper deflector plate of the No. 2 delivery roller (lower) are switched according to the direction of rotation of the delivery feeder motor.

The paper deflector plate is shifted as shown in Figures 3-126, -127 and -128 by the rotation of gear A whose drive is transmitted by gear B. The movements determine whether the copy paper is moved to the lower feeder assembly or to the copy

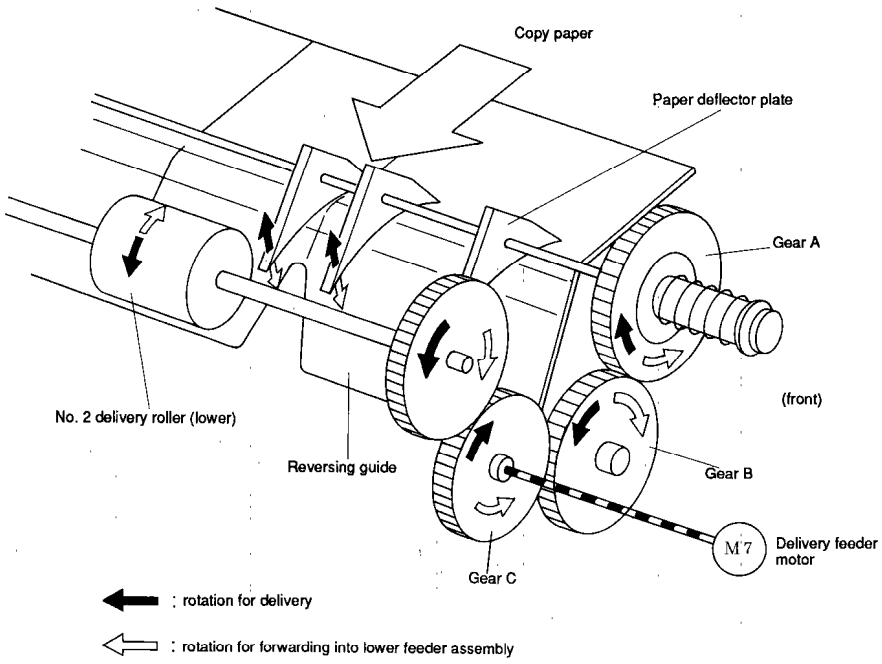

Figure 3-125

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■ At Time of Delivery

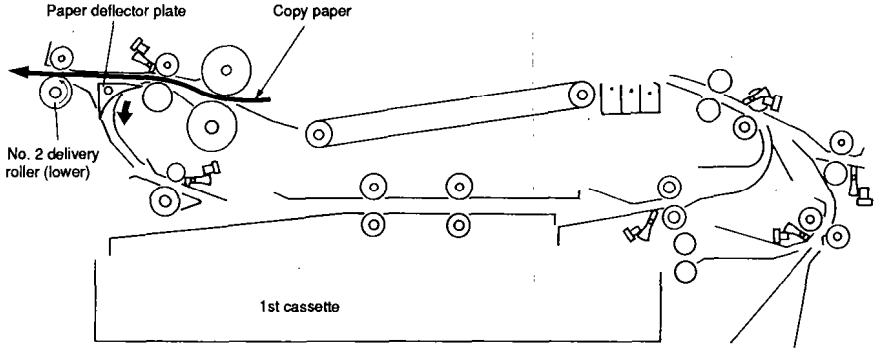

Figure 3-126

■ Forwarding to Lower Feeder Assembly (overlay copy)

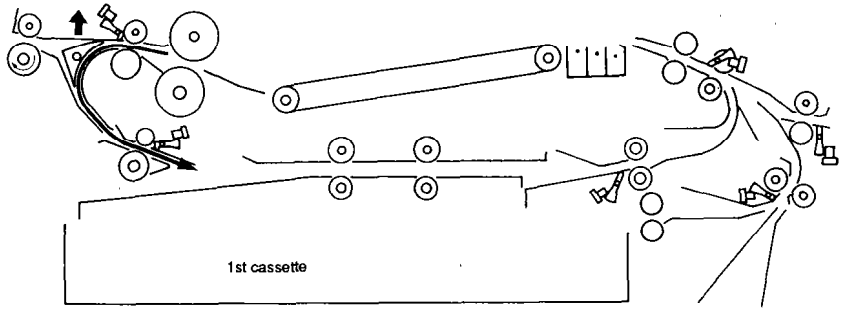

Figure 3-127

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■ At Time of Switch-Back

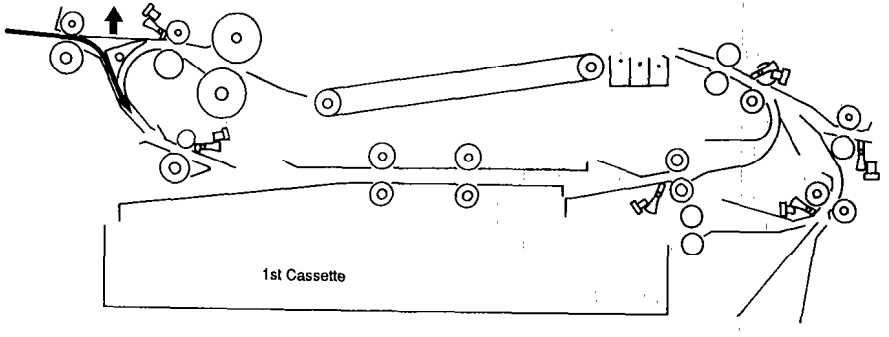

Figure 3-128

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K. Checking for Jams

The copier is equipped with the following paper sensors used to check the presence/absence of paper and the movement of paper.

- No. 1 pre-registration paper sensor (Q5)
- No. 2 pre-registration paper sensor (Q15)
- No. 3 pre-registration paper sensor (Q16)
- No. 4 pre-registration paper sensor (Q854)
- Delivery sensor (Q2)
- Lower feeder inlet paper sensor (Q3)
- Lower feeder outlet paper sensor (Q14)
- Manual feed paper sensor (Q4)

The presence/absence of paper and jams are checked in terms of the presence/absence of paper over respective sensors at such times as pre-programmed in the microprocessor on the DC controller PCB.

The copier can keep track of the remaining number of copies to be made and the copy modes effective at time of a jam; for this reason, the copy count need not be reset after opening and closing the machine for jam removal.

The microprocessor identifies the following conditions as jams; in addition, it identifies a jam if any of the sensors detects paper at time of power-on. Opening of the upper right door, lower door, or delivery door and shifting the manual feed tray cover or the cassette are also identified as a jam.

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1. No. 1 Pre-Registration Delay Jam

The copy paper does not reach the No. 1 pre-registration paper sensor (Q5) within a specific period of time after the No. 2 registration roller clutch solenoid (SL8) has gone ON.

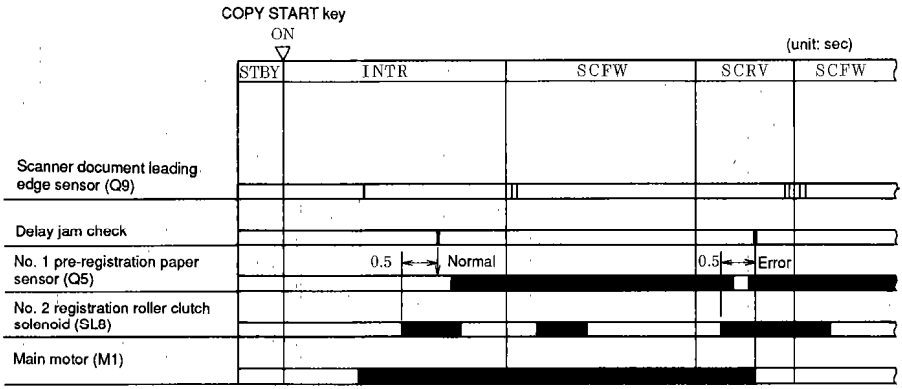

Figure 3-129

2. No. 1 Pre-Registration Timing Jam

The copy paper reaches the No. 1 pre-registration paper sensor (Q5) before a specific period of time after the No. 2 registration roller clutch solenoid (SL8) has gone ON.

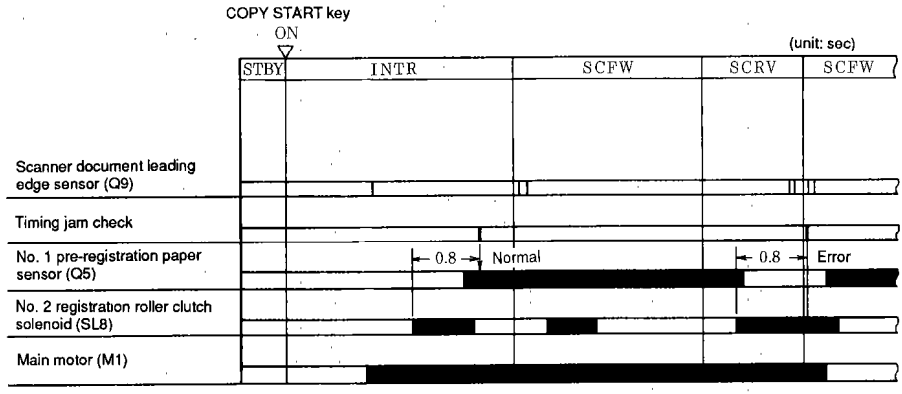

Figure 3-130

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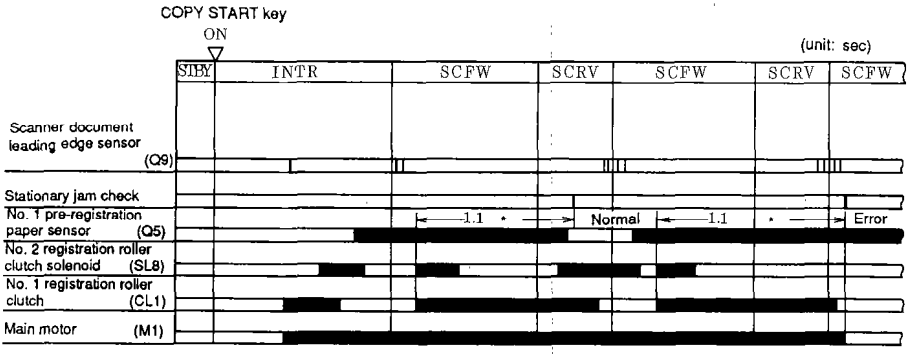
3. No. 1 Pre-Registration Stationary Jam

The copy paper does not move past the No. 1 pre-registration paper sensor (Q5) within a specific period of time after the No. 2 registration roller clutch solenoid (SL8) has gone ON.

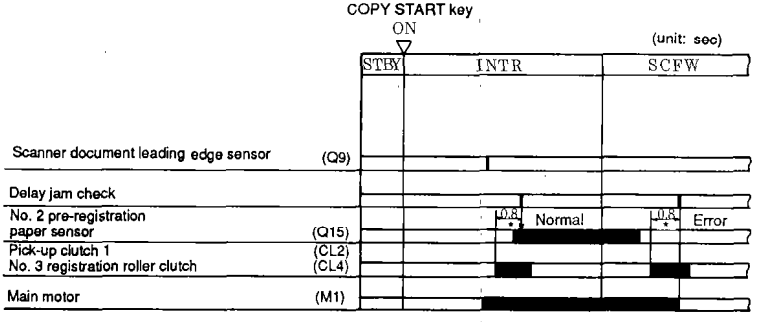


* Varies depending on the size of copy paper used; the above represents A4 paper.

Figure 3-131

4. No. 2 Pre-Registration Delay Jam

The copy paper does not reach the No. 2 pre-registration sensor (Q15) within a specific period of time after pick-up clutch 1 (CL2) or the No. 3 registration roller clutch (CL4) has gone ON.



* Varies depending on the source of pick-up; the above represents pick-up from the 1st cassette.
- 0.9 sec if pick-up is from the 2nd cassette.
- 1.0 sec if pick-up is from the No. 3 registration roller.

Figure 3-132

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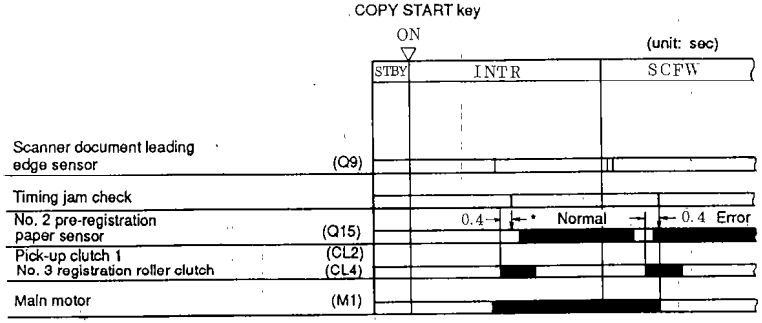
5. No. 2 Pre-Registration Timing Jam

The copy paper reaches the No. 2 pre-registration paper sensor (Q15) before a specific period of time after pick-up clutch 1 (CL2) or the No. 3 registration roller clutch (CL4) has gone ON.

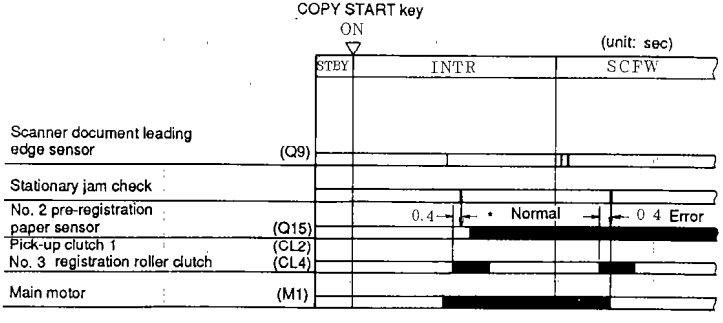


* Varies depending on the source of pick-up; the above represents pick-up from the 1st cassette.
- 0.5 sec if pick-up is from the 2nd cassette.
- 0.6 sec if pick-up is from the No. 3 registration roller.

Figure 3-133

6. No. 2 Pre-Registration Stationary Jam

The copy paper does not move past the No. 2 pre-registration paper sensor (Q15) within a specific period of time after pick-up clutch 1 (CL2) or the No. 3 registration roller clutch (CL4) has gone ON. Checks for stationary jams are executed in the same way as timing jams.



* Varies depending on the source of pick-up; the above represents pick-up from the 1st cassette.
- 0.5 sec if pick-up is from the 2nd cassette.
- 0.6 sec if pick-up is from the No. 3 registration roller.

Figure 3-134

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7. No. 3 Pre-Registration Delay Jam

The copy paper does not reach the No. 3 pre-registration paper sensor (Q16) within a specific period of time after pick-up clutch 2 (CL801) or the No. 4 registration roller clutch solenoid (SL802) has gone ON.

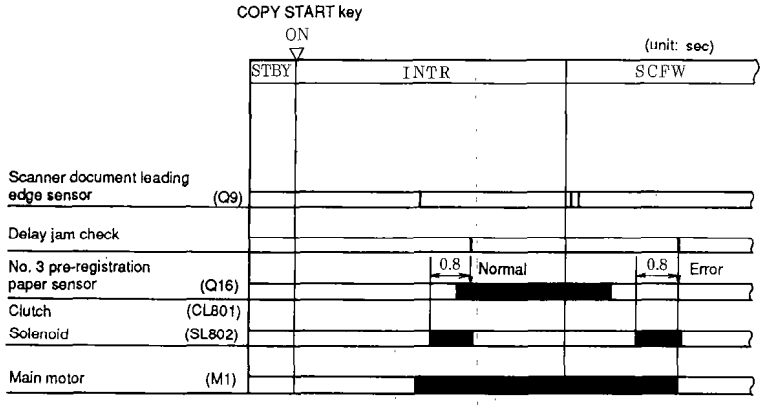

Figure 3-135

8. No. 3 Pre-Registration Timing Jam

The copy paper reaches the No. 3 pre-registration paper sensor (Q16) before a specific period of time after pick-up clutch (CL801) or the No. 4 registration roller clutch solenoid (SL802) has gone ON.

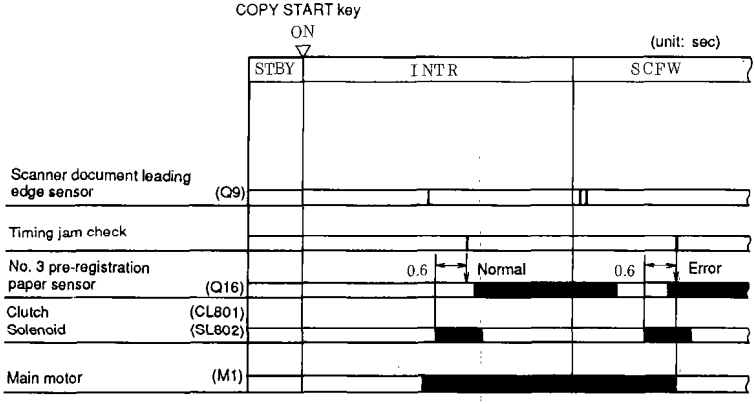

Figure 3-136

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9. No. 3 Pre-Registration Stationary Jam

The copy paper does not move past the No. 3 pre-registration paper sensor (Q16) within a specific period of time after pick-up clutch 2 (CL801) or the No. 4 registration roller clutch solenoid (SL802) has gone ON. Checks for stationary jams are executed in the same way as timing jams.

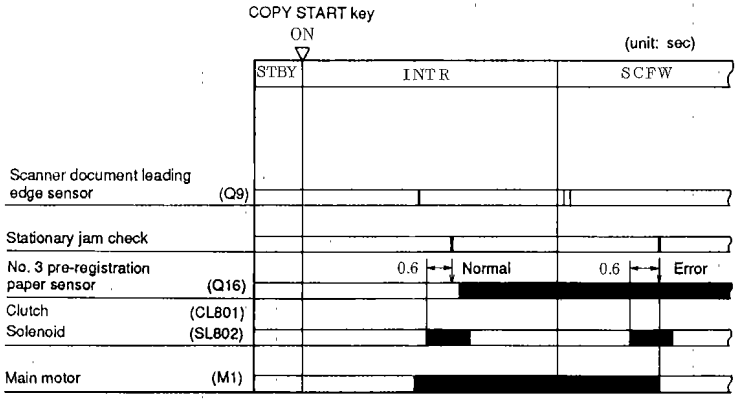

Figure 3-137

10. No. 4 Pre-Registration Delay Jam

The copy paper does not reach the No. 4 pre-registration paper sensor (Q854) within a specific period of time after pick-up clutch 2 (CL801) has gone ON.

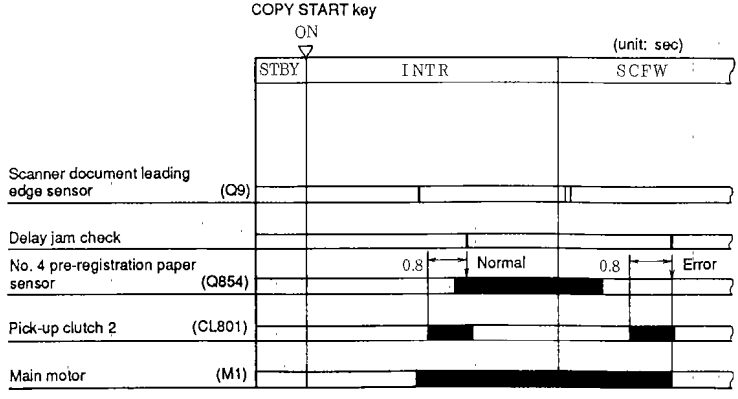

Figure 3-138

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11. No. 4 Pre-Registration Timing Jam

The copy paper reaches the No. 4 pre-registration paper sensor (Q854) before a specific period of time after pick-up clutch 2 (CL801) has gone ON.

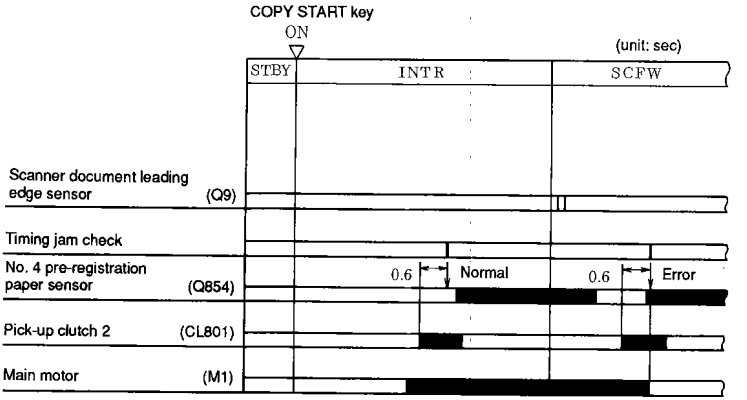

Figure 3-139

12. No. 4 Registration Roller Stationary Jam

The copy paper does not move past the No. 4 pre-registration sensor (Q854) within a specific period of time after pick-up clutch 2 (CL801) has gone ON. Checks for stationary jams are executed in the same way as timing jams.

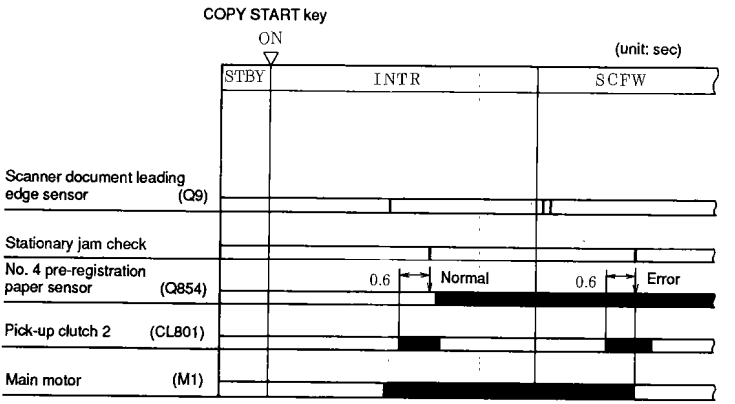

Figure 3-140

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13. Delivery Delay Jam

The copy paper does not reach the delivery sensor (Q2) within a specific period of time after the No. 1 registration roller (CL1) has gone ON.

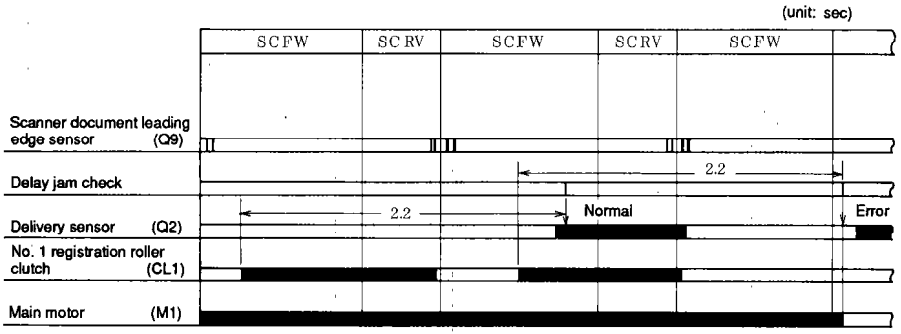

Figure 3-141

14. Delivery Timing Jam

The copy paper reaches the delivery sensor (Q2) before a specific period of time after the No. 1 registration roller clutch (CL1) has gone ON.

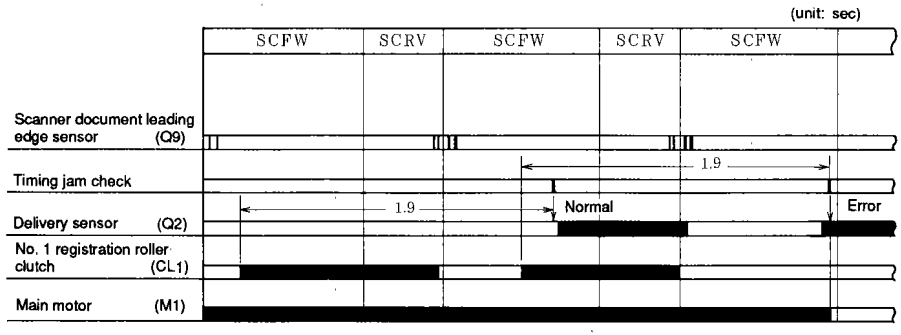

Figure 3-142

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15. Delivery Stationary Jam

The copy paper does not move past the delivery sensor (Q2) within a specific period of time after the No. 1 registration roller clutch (CL1) has gone ON. Checks for stationary jams are executed in the same way as timing jams.

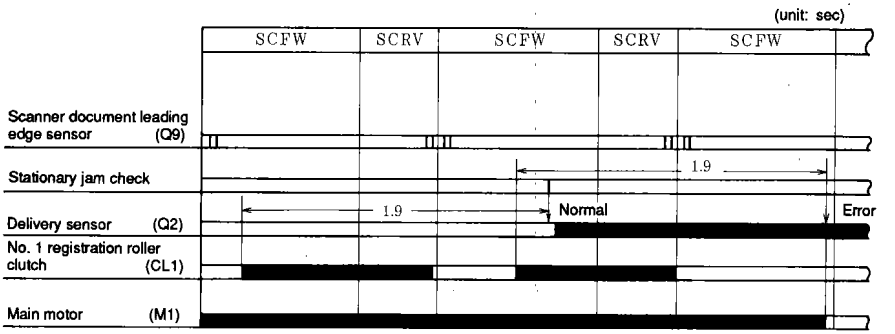

Figure 3-143

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16. Lower Feeder Inlet Delay Jam

The copy paper does not reach the lower feeder inlet paper sensor (Q3) within a specific period of time after the delivery sensor (Q2) has detected the leading edge of the paper. In the overlay mode, checks for jams are executed differently depending on the size of the paper.

a. Overlay Copy

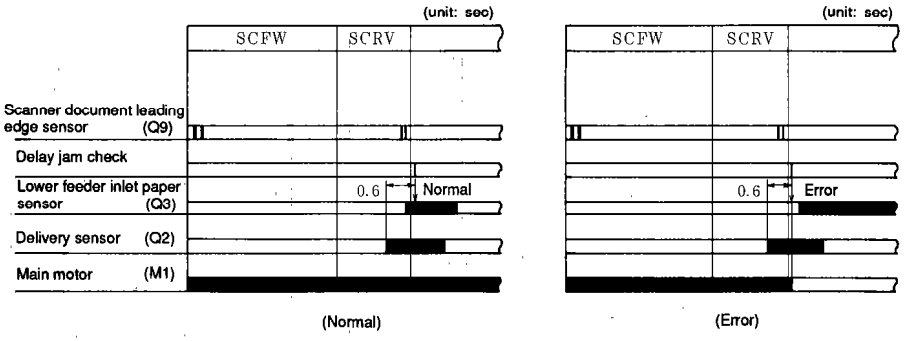
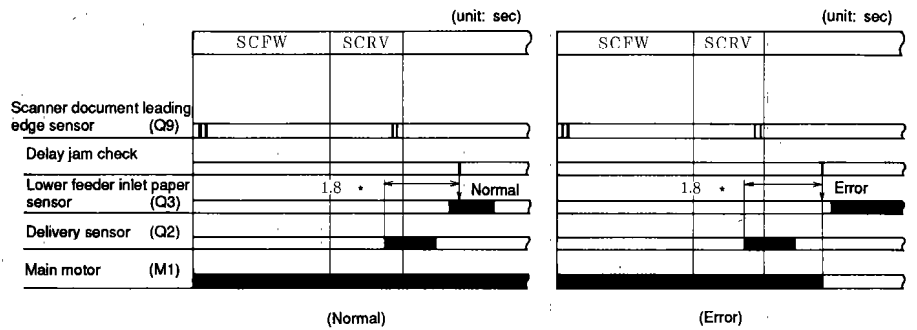


Figure 3-144

b. Two-Sided Copy



* Varies depending on the size of the copy paper used; the above represents A4 paper.

Figure 3-145

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17. Lower Feeder Inlet Timing Jam

The copy paper reaches the lower feeder inlet paper sensor (Q3) before a specific period of time after the delivery sensor (Q2) has detected the leading edge of the paper. In the overlay mode, checks are made at specific times regardless of the size of paper; in the two-sided mode, however, they vary depending on the size of paper.

a. Overlay Copy

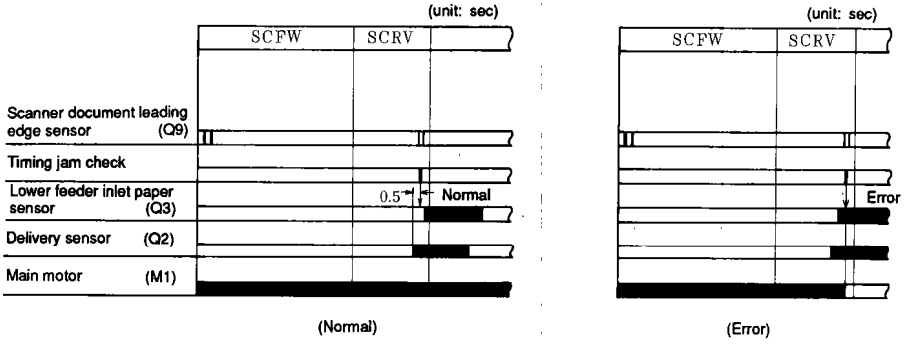
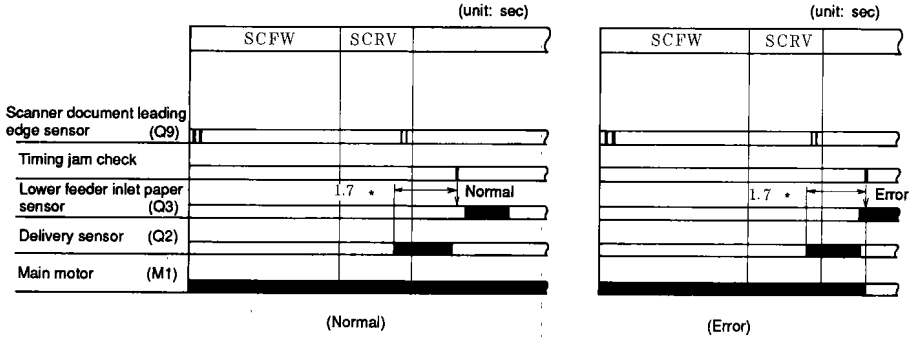


Figure 3-146

b. Two-Sided Copy



* Varies depending on the size of the copy paper used; the above represents A4 paper.

Figure 3-147

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18. Lower Feeder Inlet Stationary Jam

The copy paper does not move past the lower feeder inlet paper sensor (Q3) within a specific period of time after the delivery sensor (Q2) has detected the leading edge of paper.
Checks on stationary jams are executed in the same way as timing jams.

a. Overlay Copy

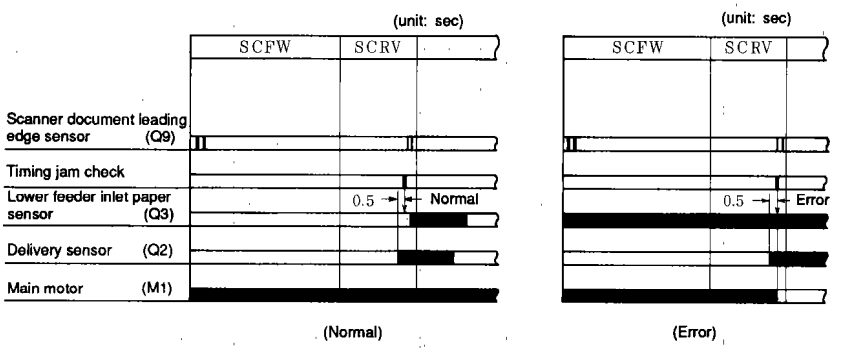
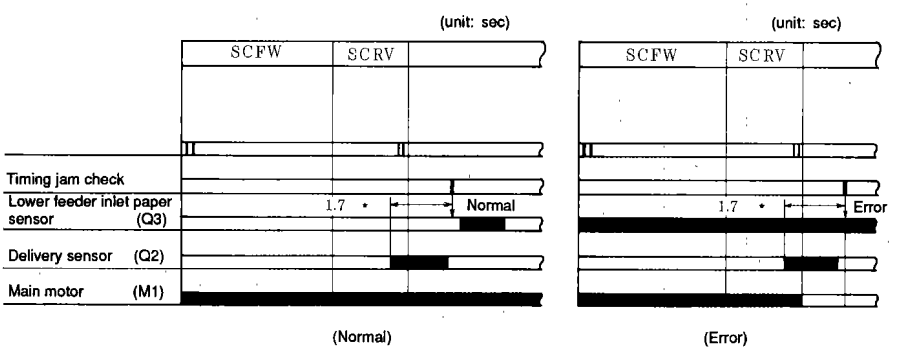


Figure 3-148

b. Two-Sided Copy



* Varies depending on the size of the copy paper used; the above represents A4 paper.

Figure 3-149

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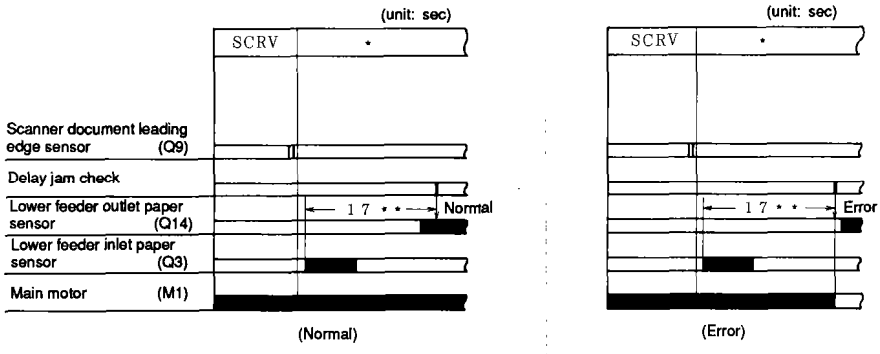
19. Lower Feeder Outlet Delay Jam

The copy paper does not reach the lower feeder outlet paper sensor (Q14) within a specific period of time after the lower feeder inlet paper sensor (Q3) has detected the leading edge of the paper.

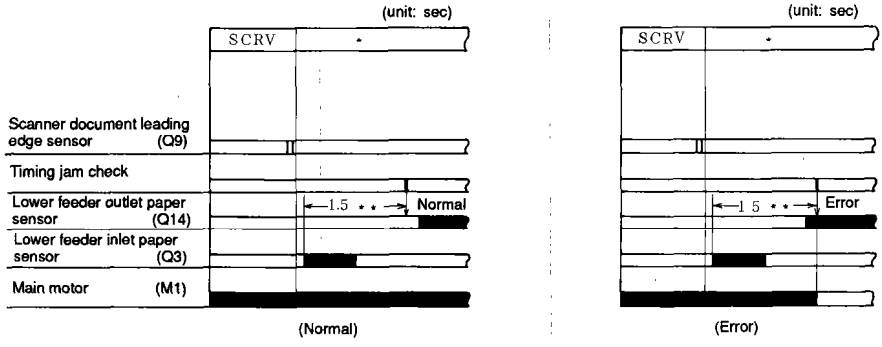


* While copy paper is being moved; i.e., scanner at standby.
** Varies depending on the size of the copy paper used; the above represents A4 paper (1 copy).

Figure 3-150

20. Lower Feeder Outlet Timing Jam

The copy paper reaches the lower feeder outlet paper sensor (Q14) before a specific period of time after the lower feeder inlet paper sensor (Q3) has detected the leading edge of the paper.



* While copy paper is being moved; i.e., scanner at standby.
** Varies depending on the size of the copy paper used; the above represents A4 paper (1 copy).

Figure 3-151

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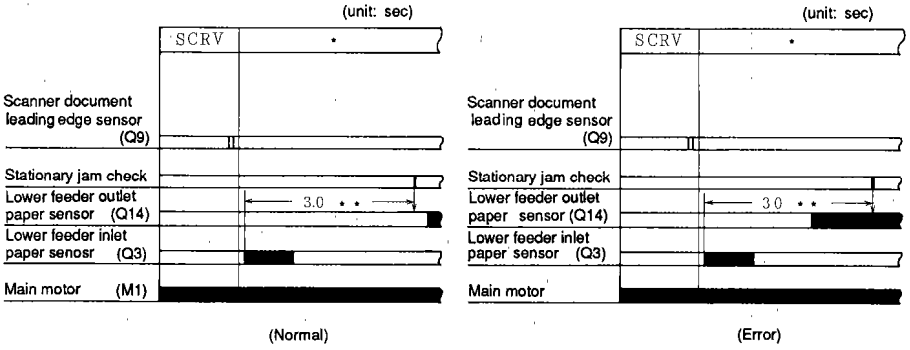
21. Lower Feeder Outlet Stationary Jam

The copy paper does not move past the lower feeder outlet paper sensor (Q14) within a specific period of time after the lower feeder inlet paper sensor (Q3) has detected the leading edge of the paper.



* While copy paper is being moved; i.e., scanner at standby.

** Varies depending on the size of the copy paper used; the above represents A4 paper (1 copy).

Figure 3-152

22. Manual Feed Delay Jam

The copy paper does not reach the manual feed paper sensor (Q4) within a specific time after the horizontal drive motor (M902) of the CD unit changer has gone ON.

If no CD unit changer is installed, see Figure 3-129; the delay is monitored by the No. 1 pre-registration sensor.

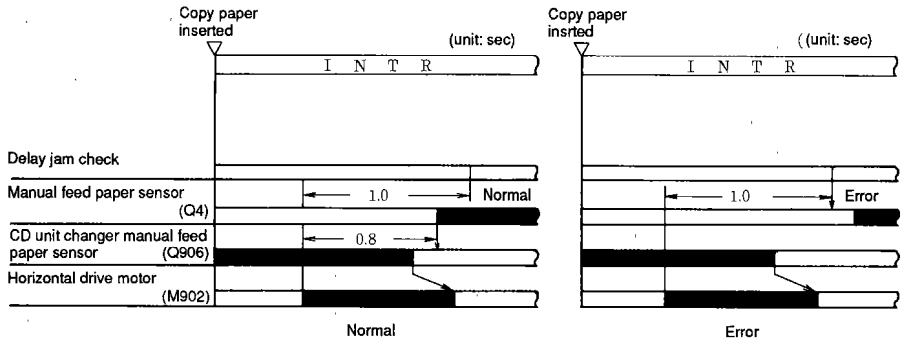


Figure 3-153

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23. Manual Feed Timing Jam

The copy paper reaches the manual feed paper sensor (Q4) before a specific time after the horizontal motor (M902) of the CD unit changer has gone ON.

If no CD unit changer is installed, see Figure 3-130; the timing is monitored by the No. 1 pre-registration sensor.

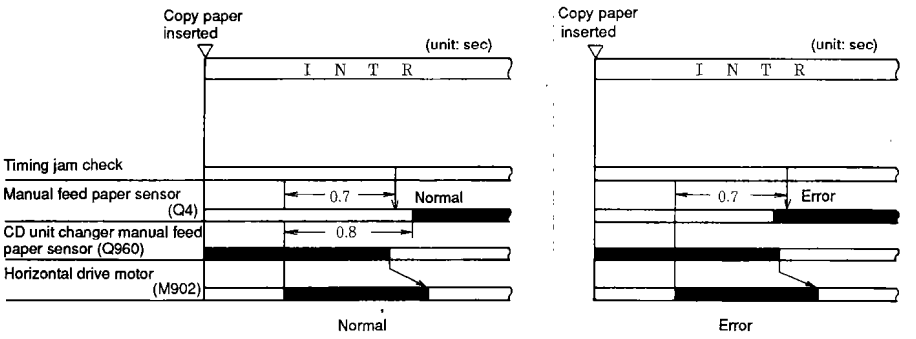

Figure 3-154

24. Manual Feed Stationary Jam

See Figure 3-129; the delay is monitored by the No. 1 pre-registration sensor.

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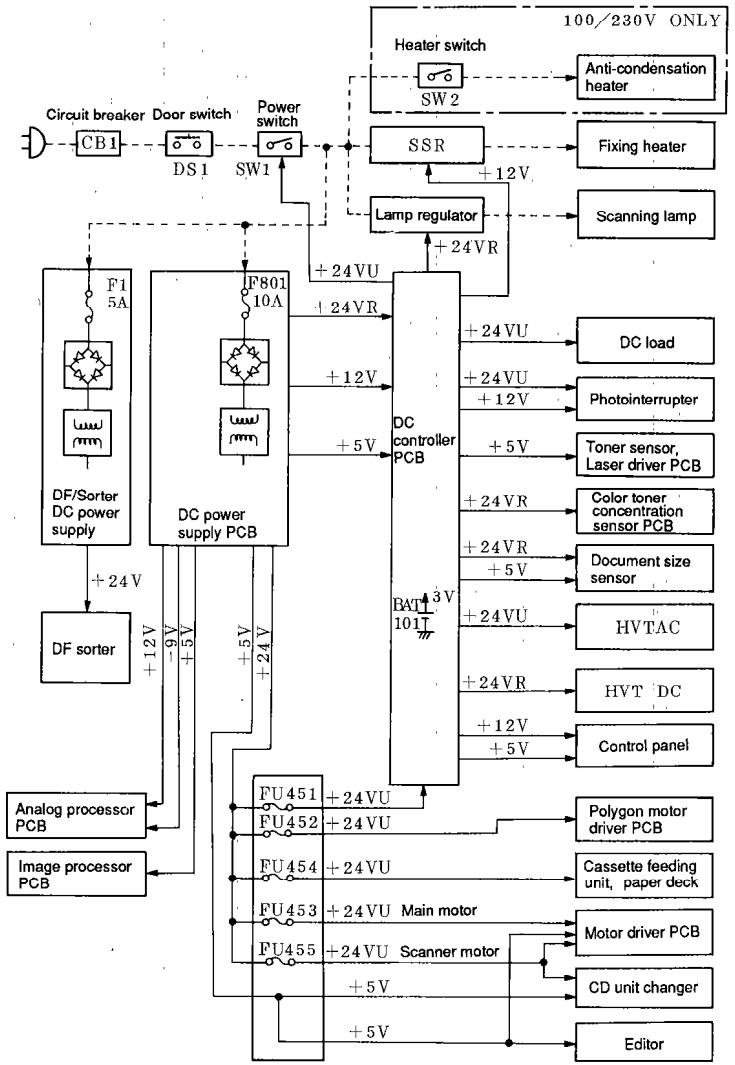
VI. POWER SUPPLY

A. Outline of Power Supply



Note: The dashed lines indicate AC power lines.

Figure 3-155

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When the door switch and the power switch are turned ON, the DC power supply PCB is supplied with AC power. The auto shut-off mechanism causes the DC controller PCB to turn the power switch OFF.

The DC power supply PCB generates +24 VR, +24 VU, +12 V, +5 V, and –9V; +24 VU is sent to the DC controller PCB and the motor driver PCB through the fuse on the fuse PCB.

The DC power supply PCB for the DF/sorter supplies the sorter with 24V power.

When the copier's door switch and the power switch are turned OFF, the DC power to the DC controller PCB will be cut OFF; for this reason, the RAM on the DC controller PCB and the date/time memory are backed up by a lithium battery (BAT101).

Note:
The tolerances for the DC power supply are as follows:

+24VR	±1%
+24VU	±7%
+12V	±5%
+ 5V	±4%
– 9V	±1.5V

⚠ CAUTION:
Replace the lithium battery only with the one listed in the Parts Catalog. Use of a different battery may present a risk of fire or explosion. The battery may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble, or dispose of it in fire.
Keep the battery out of reach of children and discard any used battery promptly.

B. Protection Mechanism for the Power Circuit

The DC power supply PCB and the DC power supply PCB for the RDF/sorter are equipped with an overcurrent sensor circuit which, when any of the loads suffer a short circuit for some reason, are activated to shut off the output.

When the output is shut off, open the front door to turn the door switch OFF; then, correct the load, and turn the door switch ON once again. Repeated short-circuiting and resetting, however, can blow the built-in fuse.

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VII. PAPER DECK PEDESTAL

A. Outline

The paper deck pedestal is equipped with two decks (left, right) and is used to feed paper from each deck to the copier in response to signals from the copier.

The deck motor drives the loads used to operate the paper pick-up/feed mechanism and the left and right lifters.

After each copying operation, the left feeder assembly found between the left deck and the No. 3 registration roller picks up a single sheet of paper from the left deck and keeps it; since paper picked up from the left deck has to move through a longer path, this arrangement serves to shorten the first copy time.

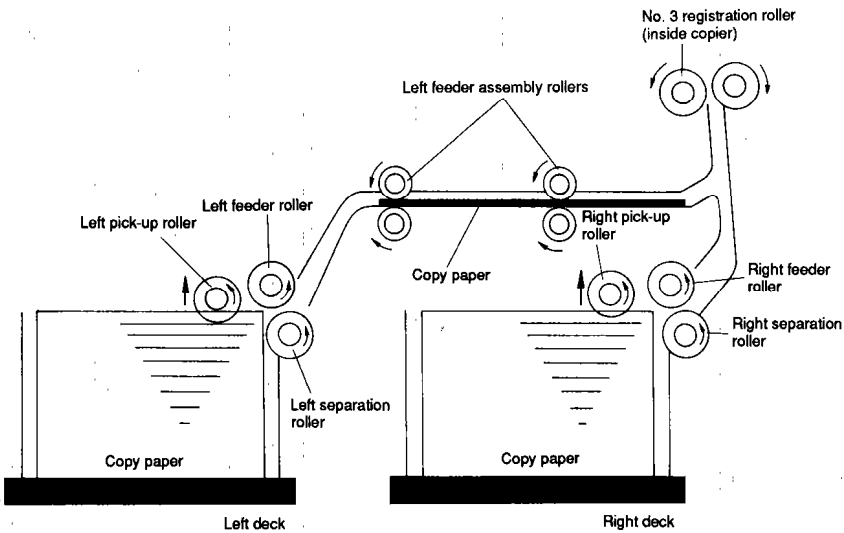

Figure 3-200

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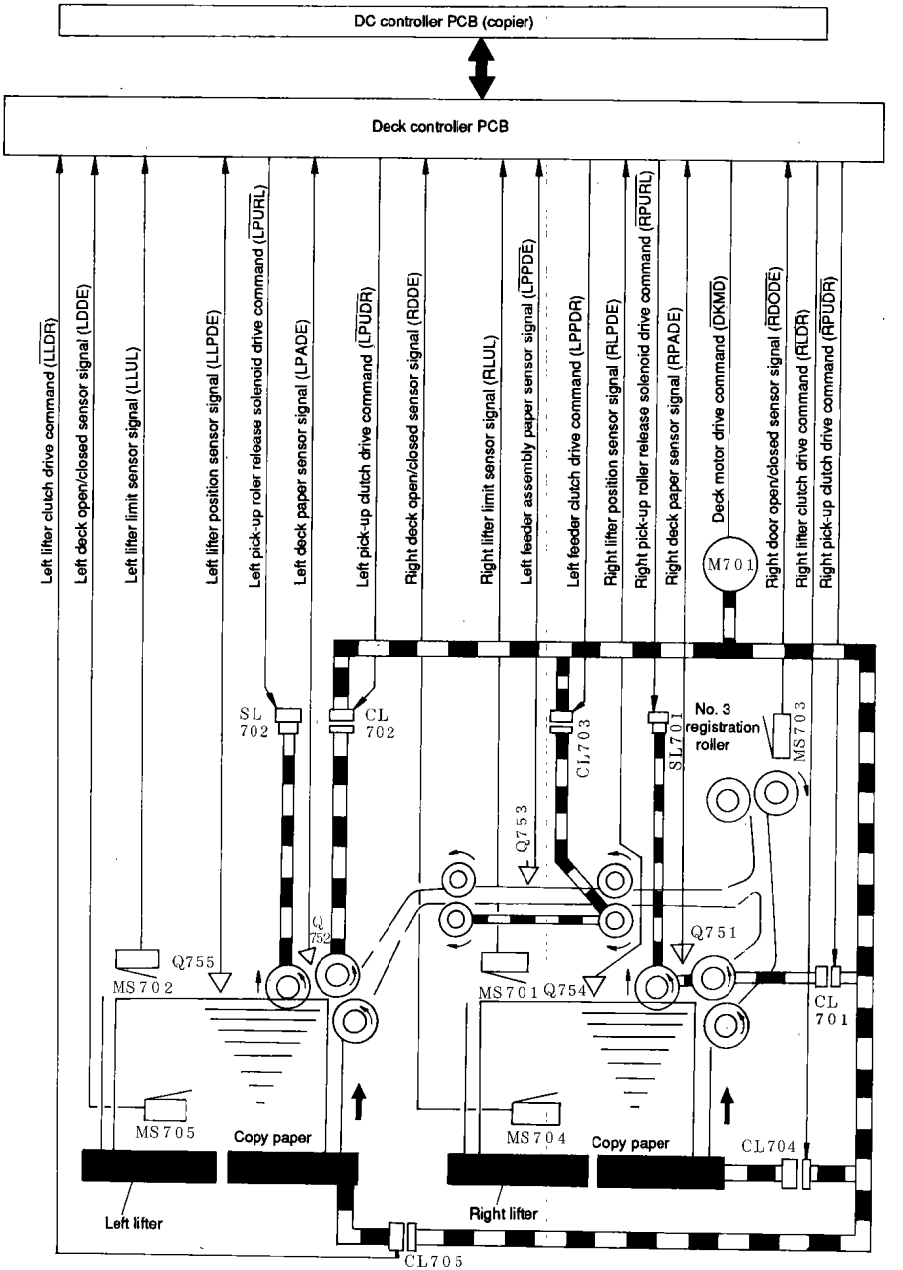

Figure 3-201

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B. Electrical Circuitry

The paper deck pedestal is controlled by its deck controller PCB and signals coming from the copier.

The signals from the copier are sent according to the pre-programmed instructions stored in the copier's memory.

The controller PCB inside the deck controls the motors, clutches, and other loads based on the signals from the copier.

The deck controller PCB is supplied with 24 V power by the copier's DC power supply and, in turn, supplies each load with 24V or 12V power.

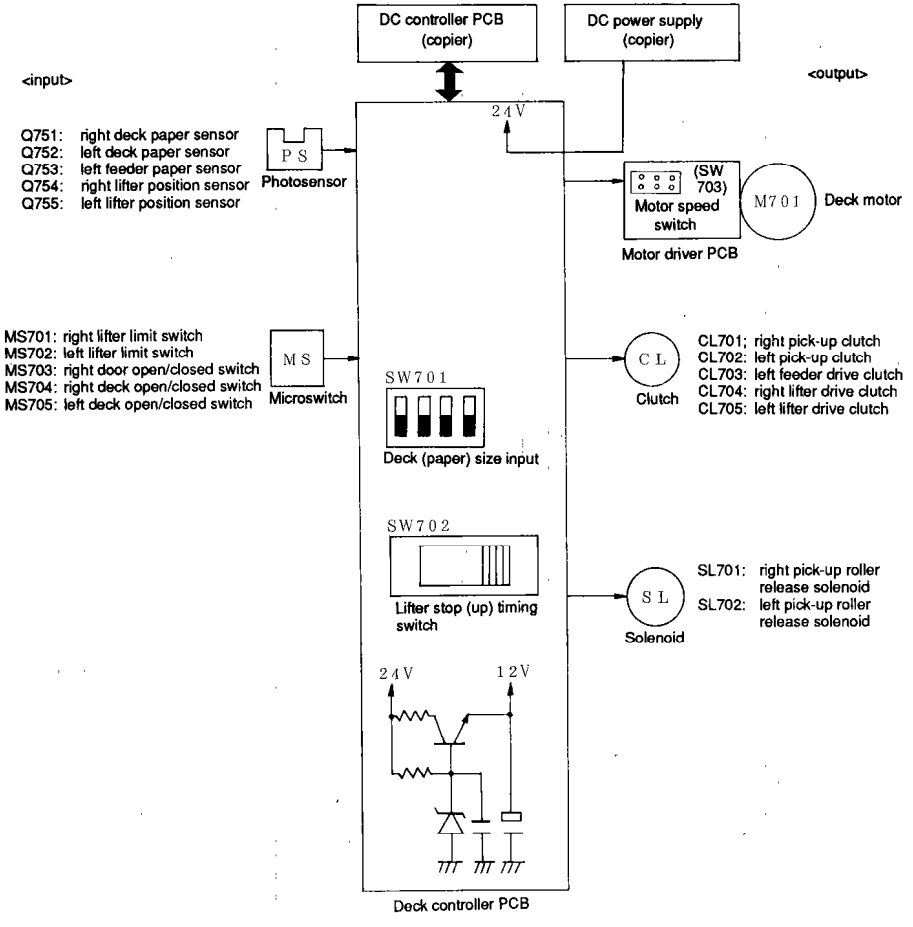

Figure 3-202

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C. Inputs to and Outputs from Deck Controller

1. Inputs to and Outputs from Deck Controller

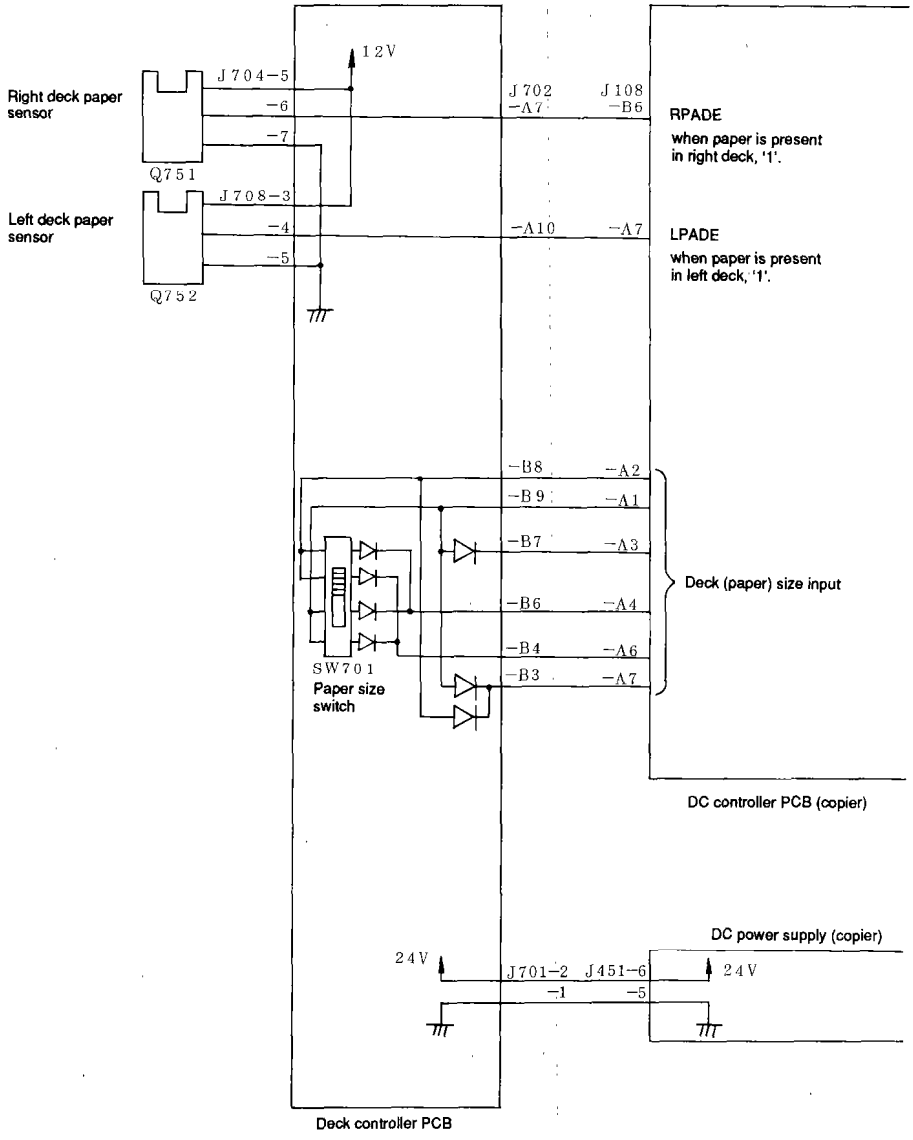

Figure 3-203

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2. Inputs to and Outputs from Deck Controller

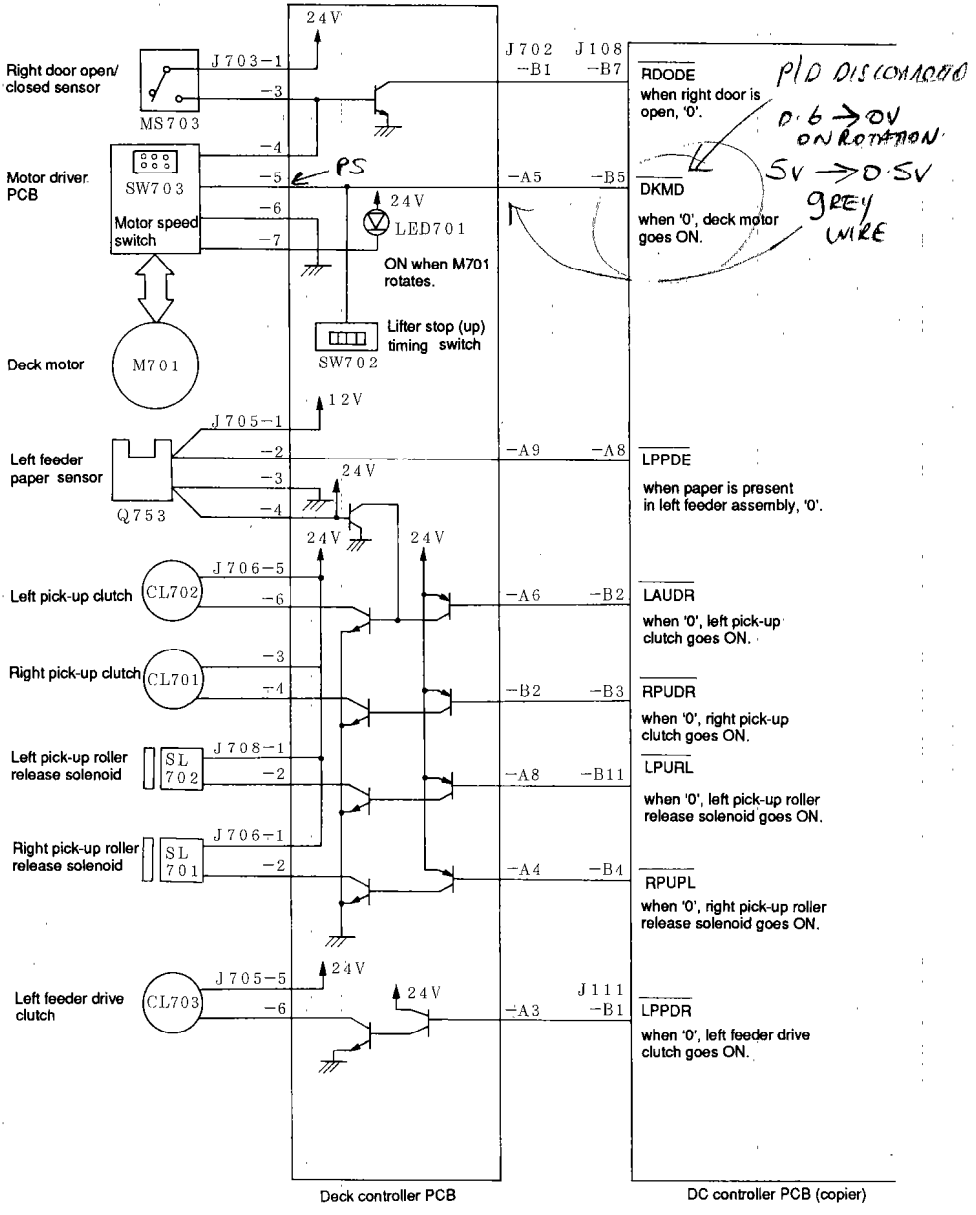

Figure 3-204

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3. Inputs to and Outputs from Deck Controller

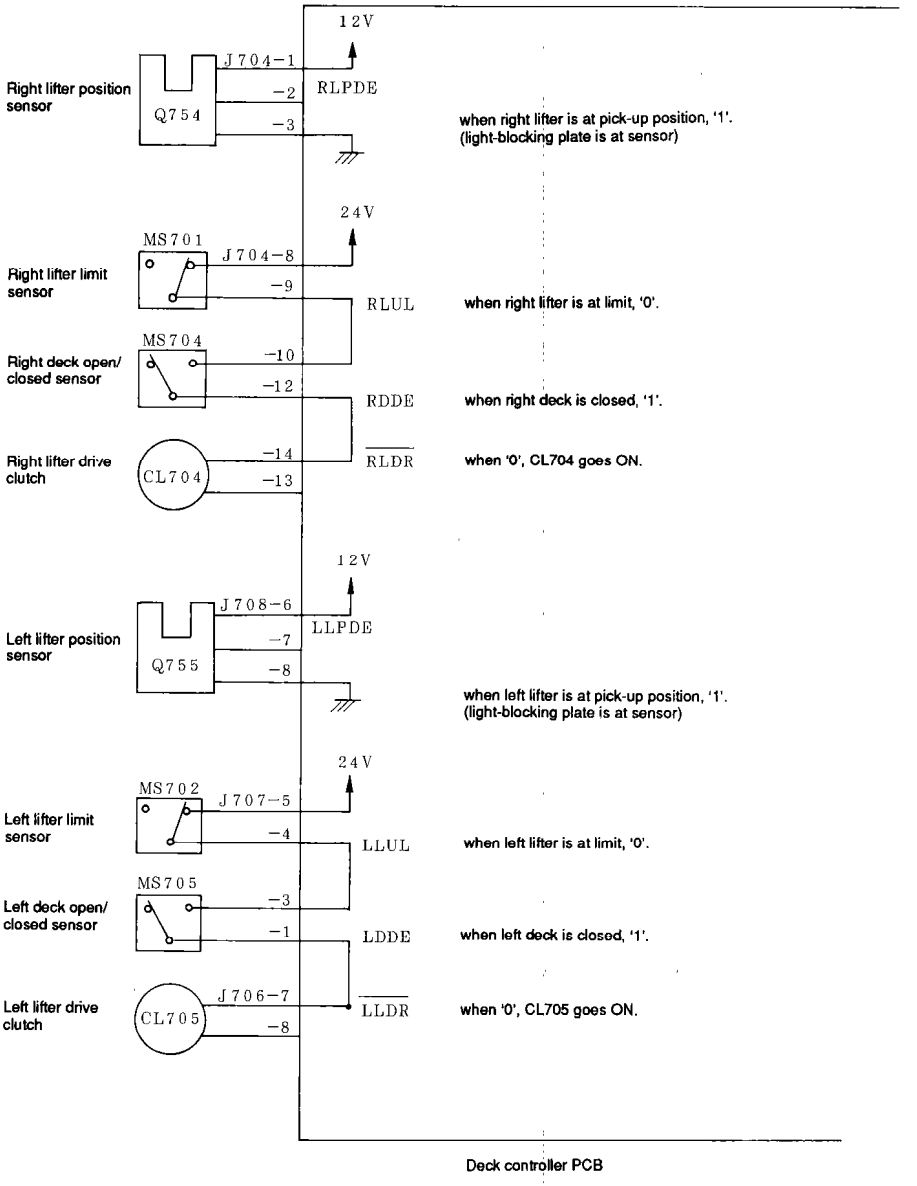

Figure 3-205

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D. Pick-Up/Feed Mechanism

1. Pick-Up from Right Deck

When the COPY START key is pressed on the copier, the copier's DC controller sends the deck motor drive command (DKMD) and, at the same time, the deck motor starts to rotate; the rotation of the motor causes the right pick-up roller to rotate, picking up paper from the right deck.

After pick-up, the paper is forwarded by the right feeder roller to the copier's No. 3 registration roller and made to butt against the No. 3 registration roller to form an arch; then, it is moved to the No. 2 registration roller.

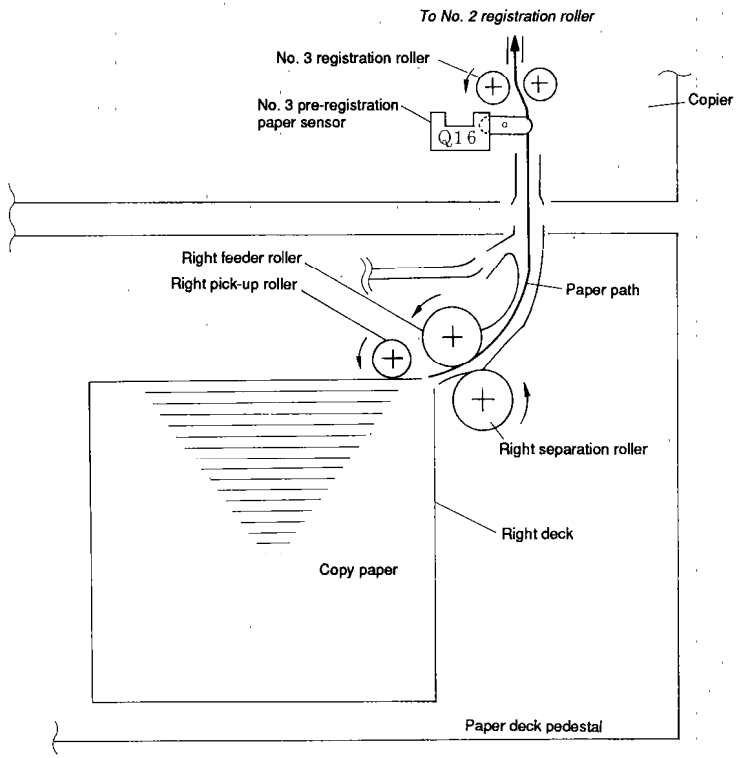

Figure 3-206 Pick-Up from Right Deck

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Sequence of Operations (pick-up from right deck)

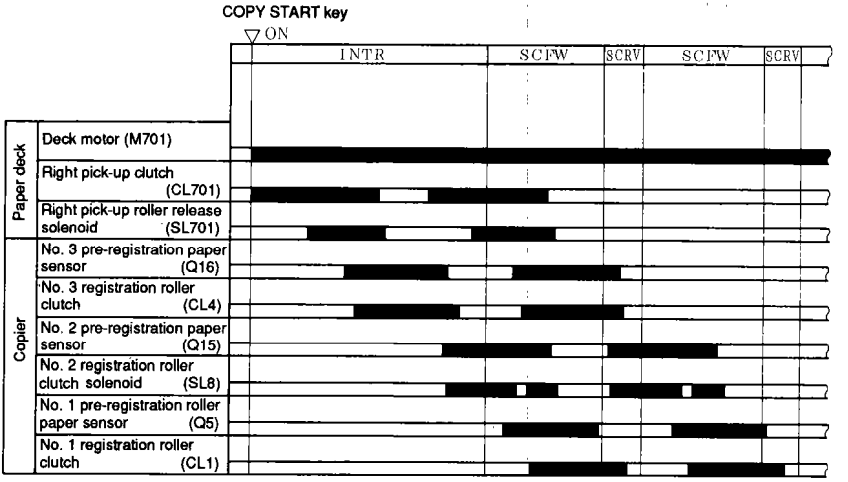

Figure 3-207 A4, 2 copies (pick-up from right deck)

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2. Pick-Up from Left Deck

When the copier's COPY START key is pressed, the copier's DC controller PCB generates $\overline{DKMD}$; in response, the deck motor starts to rotate to rotate the left pick-up roller for pick-up from the left deck.

After the pick-up, the paper moves through the left feeder assembly and then to the copier's No. 3 registration roller assembly.

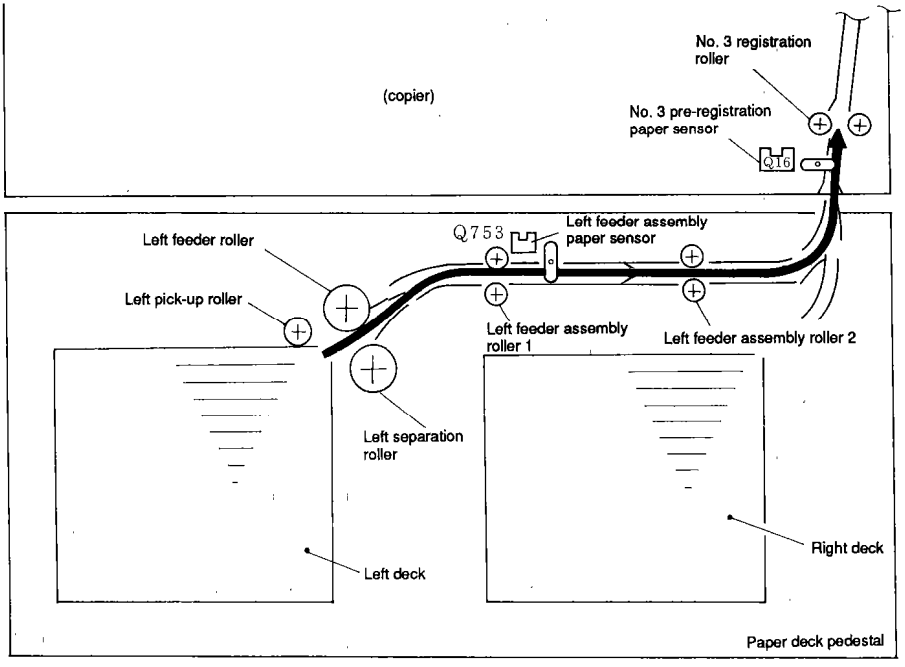

Figure 3-208

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3. Advance Pick-Up from Left Deck

If pick-up is from the left deck, a single sheet of copy paper is picked up after each copying operation from the left deck.

The paper is moved to the left feeder assembly and kept inside it in preparation for the next copying operation , i.e., it, will not be fed to the copier at the time. This mechanism is called *advance pick-up* and serves to shorten the first copy time when pick-up is made from the left feeder assembly, in which case the path will be somewhat longer.

The copier, even after power-on, remembers about the copy paper kept in the left feeder assembly; for this reason, it will not indicate a jam (stationary) at time of power-on.

If the paper is removed for some reason from the left feeder assembly, another sheet of copy paper will be picked up newly next time the left deck is used.

Note:
The copier cannot recognize detachment of the left feeder assembly. If it happens, the left deck pick-up signal from the copier will be forced OFF by the deck controller circuit.
A left feeder pick-up delay jam still occurs, however, since copying operation will be started despite the deactivation of the signal.

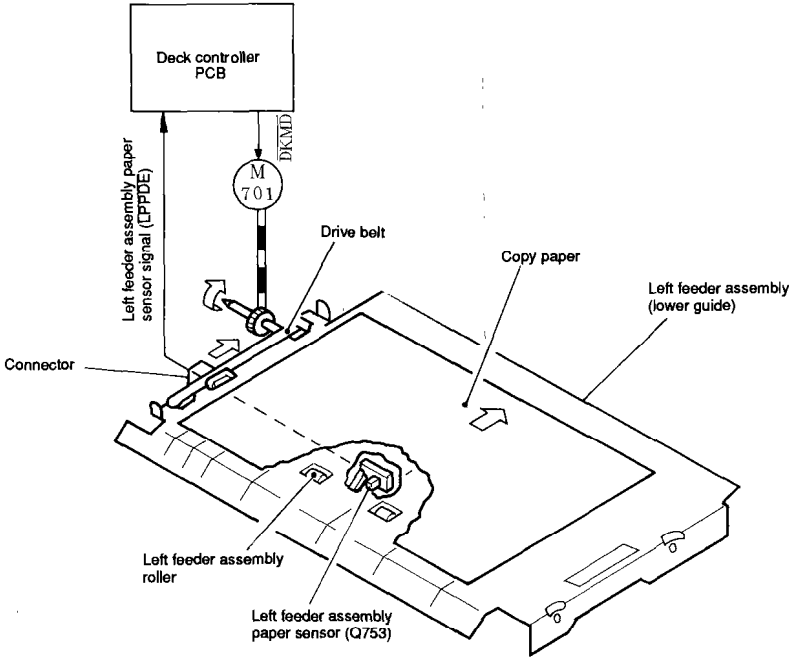

Figure 3-209

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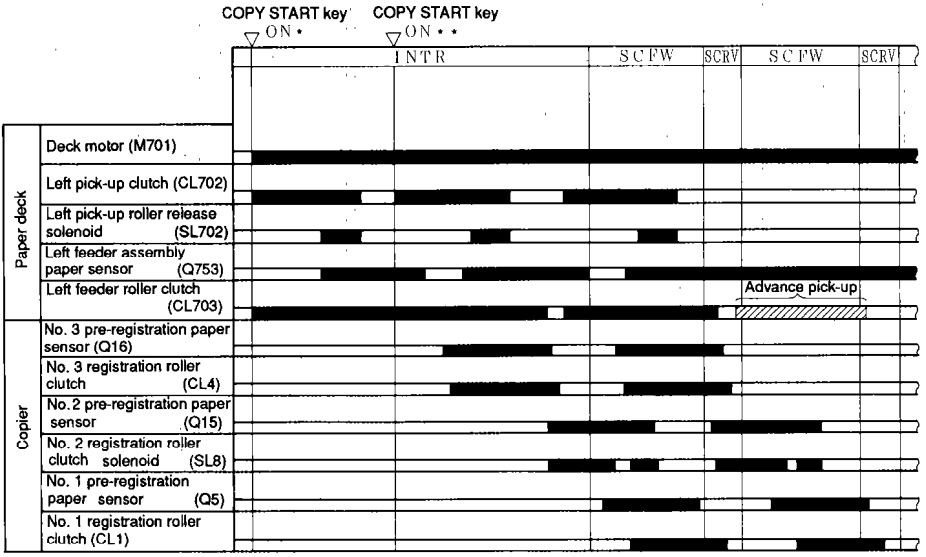
Sequence of Operations (pick-up from left deck)



* Paper is absent in the left feeder assembly when the COPY START key is pressed.
** Paper is present in the left feeder assembly when the COPY START key is pressed.

Figure 3-210 A4, 2 Copies (pick-up from left deck)

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E. Releasing the Pick-Up Roller and the Separation Roller

The machine's paper deck pedestal is a front loading type; for this reason, the pick-up roller and the separation roller are released when the paper deck is slid out for supplying copy paper or removing jams.

1. Releasing the Pick-Up Roller

The pick-up roller is released when the grip on the deck is pulled.

When the cam attached to the end of the roller release shaft becomes disengaged from the latch on the grip, the arm on the roller release shaft moves up to lift the pick-up roller. When the deck is slid in, on the other hand, the cam rides over the latch on the grip, causing the arm and the pick-up roller to lower.

The arm is also used to release the pick-up roller at time of pick-up operation.

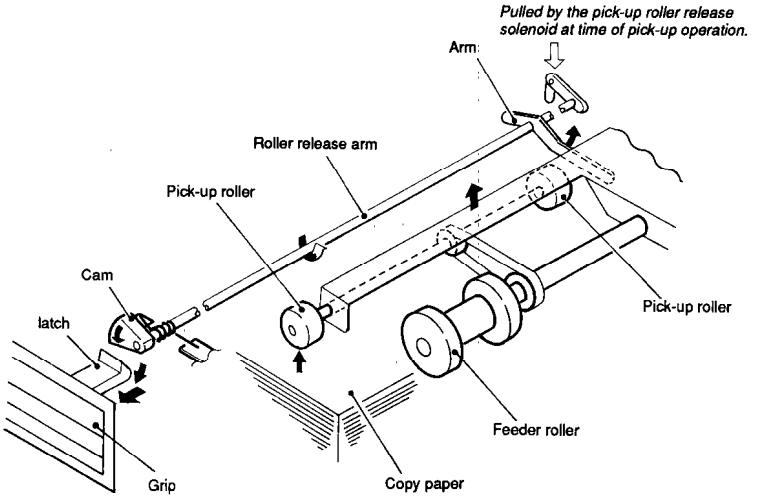

Figure 3-211

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2. Releasing the Separation Roller

When the deck is slid out of the machine, the release lever, which has been forced down by the deck right end plate cam, moves the separation roller to the direction of disengagement by the work of the release spring.

This design is to prevent contact between the separation roller and the deck pick-up guide.

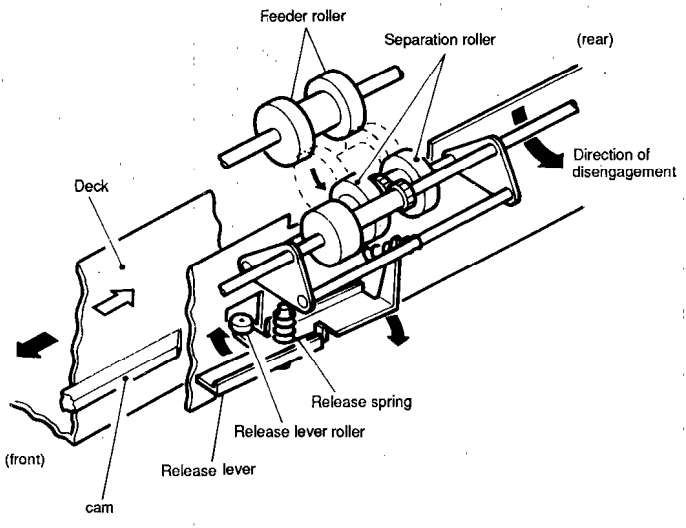

Figure 3-212

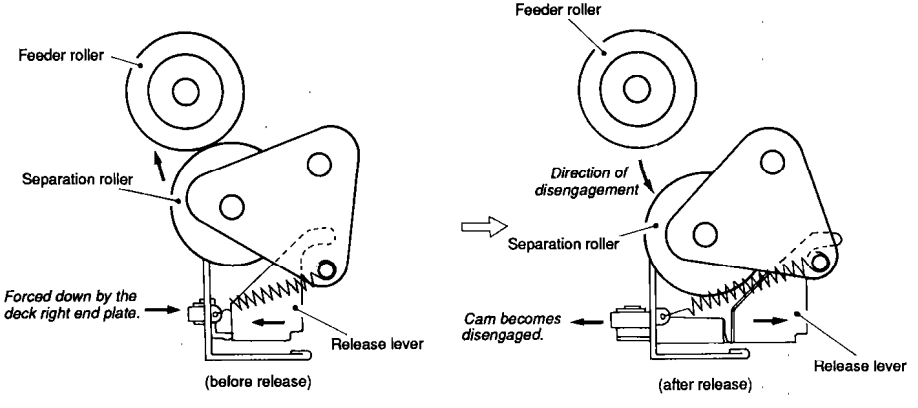

Figure 3-213

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F. Moving the Lifter Up and Down (left/right deck)

When paper is set in the deck and the deck is closed, the deck open/closed sensor (MS704, MS705) goes ON; this condition causes the deck motor to rotate and the lifter drive clutch (CL704, CL705) to go ON, moving the lifter up.

When the lifter has moved up and reached the lifter position sensor (Q751, Q752), the lifter drive clutch goes OFF; the lifter is then kept up by a one-way gear.

The lifter is moved up regardless of the state of the machine as long as the copier is powered.

When the deck is detached from the machine, the wire cable take-up gear becomes disengaged from the one-way gear, allowing the lifter to lower on its own weight.

Note:
If the lifter does not stop moving up after it has reached the lifter position sensor, the lifter limit microswitch (MS701, MS702) cuts off the power to the lifter drive clutch (CL704, CL705).
The lifter will not be moved up if the left feeder assembly is not set correctly to the paper deck pedestal.

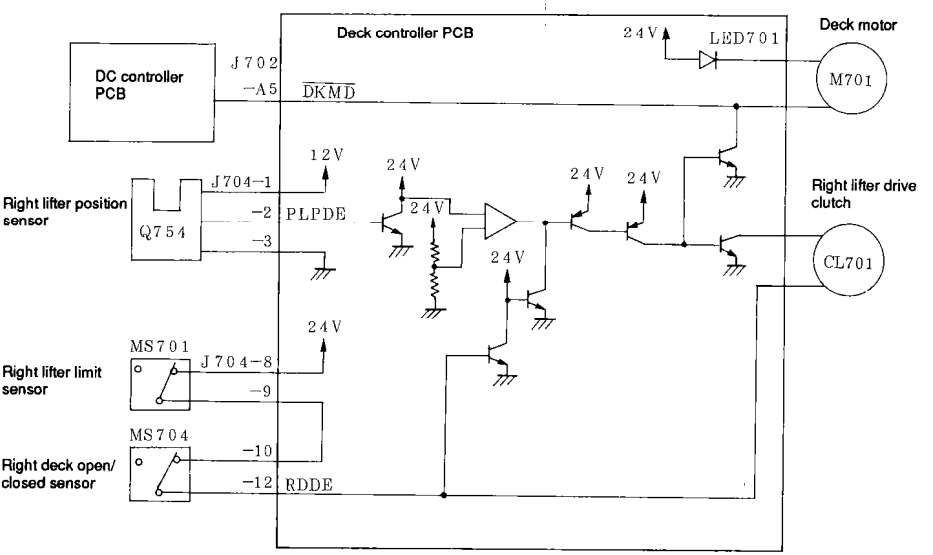

Figure 3-214 Right Lifter Drive Circuit

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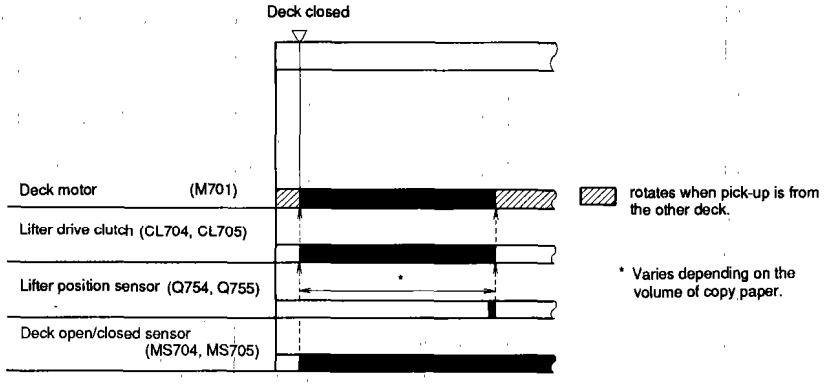
Deck closed
Deck motor (M701)
Lifter drive clutch (CL704, CL705)
Lifter position sensor (Q754, Q755)
Deck open/closed sensor (MS704, MS705)
rotates when pick-up is from the other deck.
* Varies depending on the volume of copy paper.

Figure 3-215 Lifter Up Movement

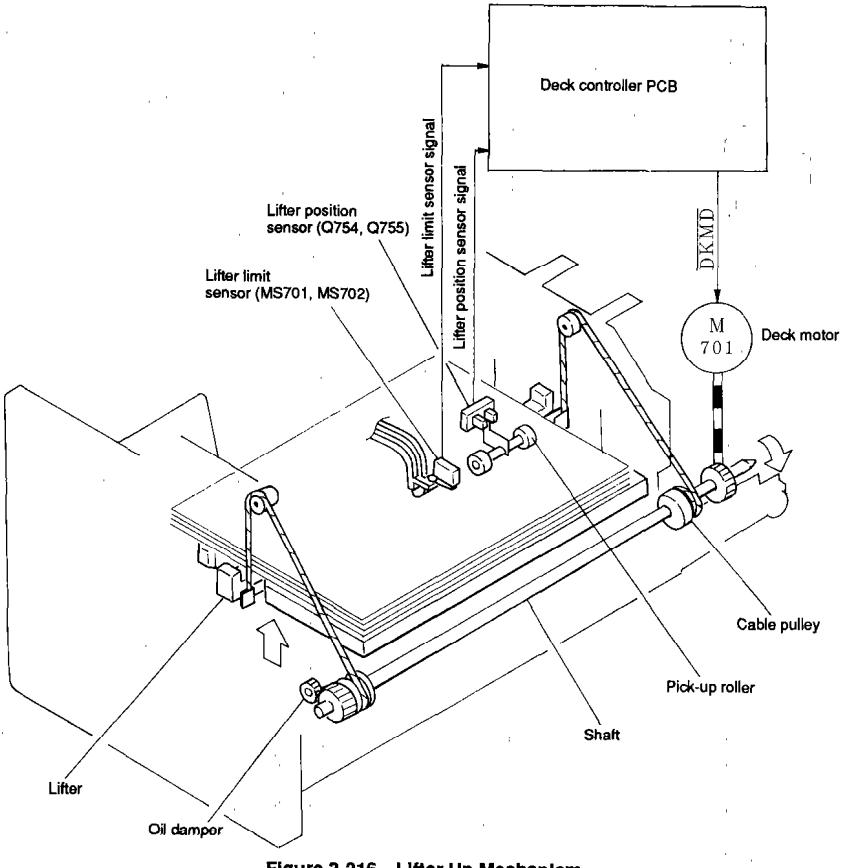

Figure 3-216 Lifter Up Mechanism

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G. Checking the Paper in the Deck (left/right deck)

The mechanism to check the paper in the deck is attached on the same plate as the lifter position sensor.

When copy paper is present on the lifter, the sensor arm moves over to the left/right deck paper sensor as the lifter moves up.

If paper is absent, the sensor arm moves into the lifter hole and remains still while the lifter moves up; this condition is identified as the absence of paper.

The condition in which the lifter does not move to a specific position in the presence of paper for some reason will also be identified as the absence of paper.

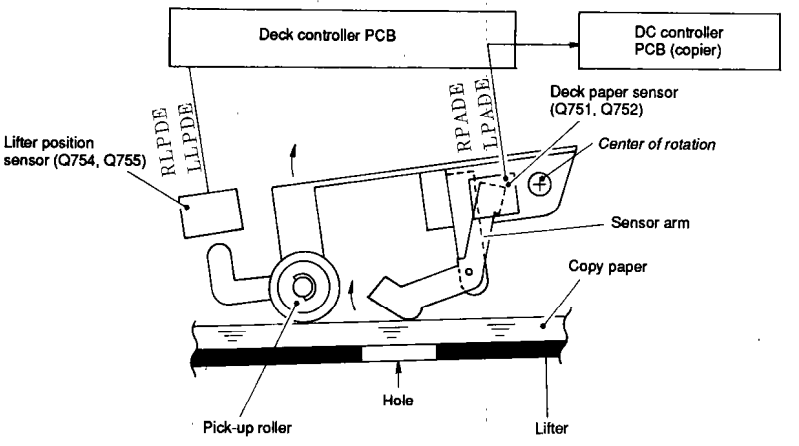

Figure 3-217 Paper on Lifter

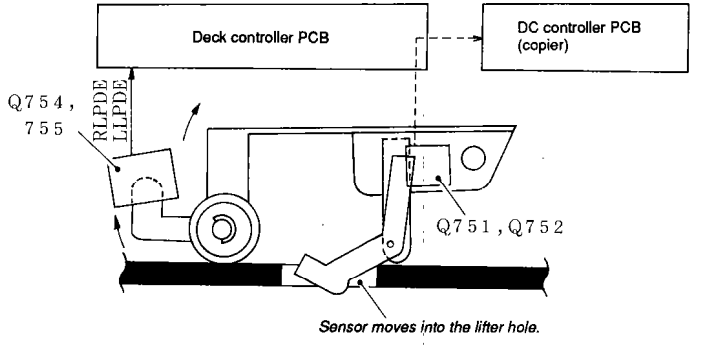

Figure 3-218 No Paper on Lifter

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H. Checking for Jams

1. Right Deck

a. No. 3 Pre-Registration Jam

The copy paper does not reach the No. 3 pre-registration sensor within about 1.0 sec after the right pick-up clutch has gone ON; the condition is identified as a delay jam.

If the No. 3 pre-registration remains ON about 0.5 sec after the right pick-up clutch has gone ON, a stationary jam (previous paper) will be identified.

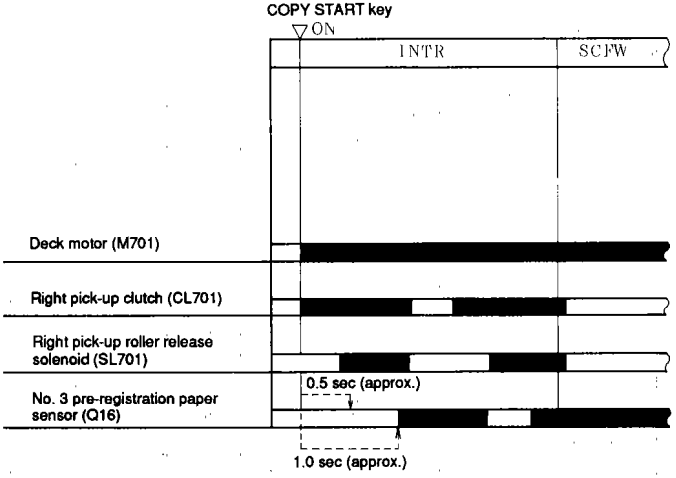

Figure 3-219

b. No. 2 Pre-Registration Jam

The copy paper does not reach the No. 2 pre-registration sensor with about 1.0 sec after the No. 3 registration roller clutch has gone ON; the condition is identified as a delay jam.

If the No. 2 pre-registration paper sensor remains ON about 0.6 sec after the No. 3 registration clutch has gone ON, a stationary jam (previous paper) will be identified.

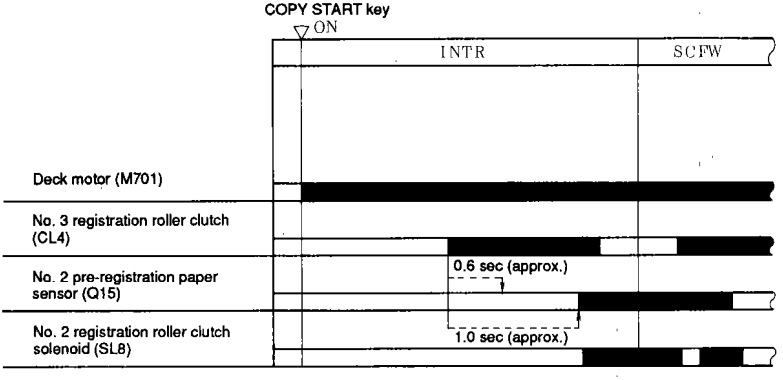

Figure 3-220

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c. No. 1 Pre-Registration Jam

The copy paper does not reach the No. 1 pre-registration paper sensor within about 0.7 sec after the No. 2 registration roller clutch solenoid has gone ON; the condition will be identified as a delay jam.

If the No. 1 pre-registration paper sensor remains ON about 0.5 sec after the No. 2 registration roller clutch solenoid has gone ON, a stationary jam (previous paper) will be identified.

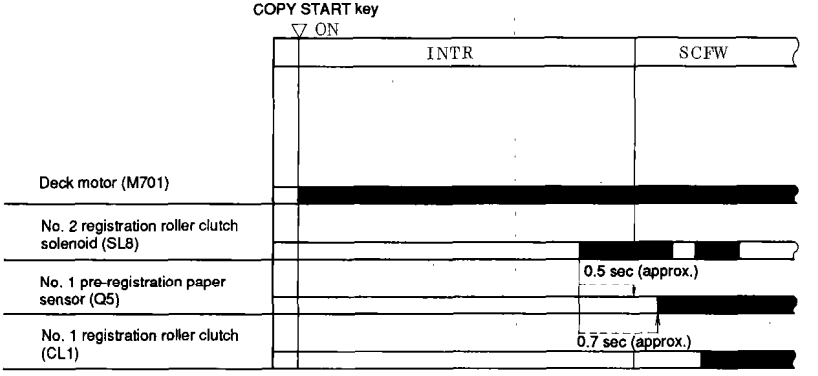

Figure 3-221

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2. Left Deck

a. Left Feeder Assembly Jam

The copy paper does not reach the left feeder assembly paper sensor within about 1.0 sec after the left pick-up clutch has gone ON; the condition will be identified as a delay jam.

If the left feeder assembly sensor remains ON about 0.4 sec after the left pick-up clutch has gone ON, a stationary jam (previous paper) will be identified.

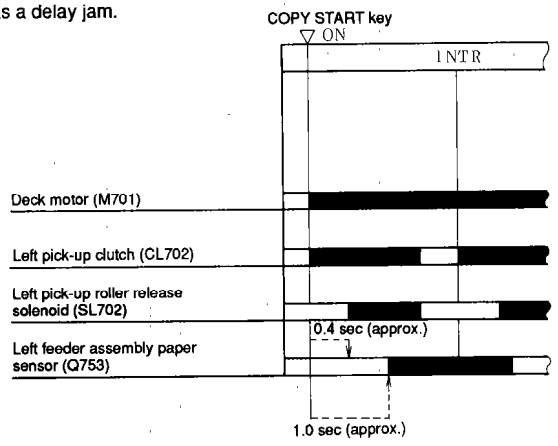

Figure 3-222

b. No. 3 Pre-Registration Jam

The preceding copy paper does not reach the No. 3 pre-registration paper sensor within about 0.9 sec after the left pick-up clutch has gone ON; the condition will be identified as a stationary jam.

If the No. 3 pre-registration paper sensor remains ON about 0.4 sec after the left pick-up clutch has gone ON, a stationary jam (previous paper) will be identified.

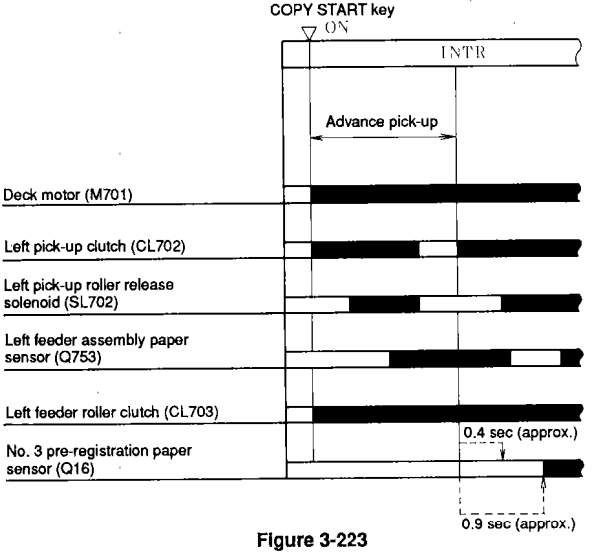

Figure 3-223

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c. No. 2 Pre-Registration Jam

The copy paper does not reach the No. 2 pre-registration paper sensor within about 1.1 sec after the No. 3 registration roller clutch has gone ON; the condition will be identified as a delay jam.

If the No. 2 pre-registration paper sensor remains ON about 0.6 sec after the No. 3 registration roller clutch has gone ON, a stationary jam (previous paper) will be identified.

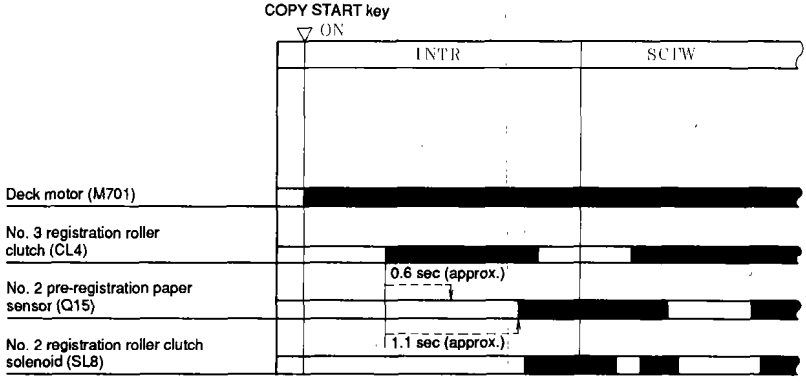

Figure 3-224

d. No. 1 Pre-Registration Jam

The conditions are the same as those of No. 1 pre-registration jams; see Figure 3-221.

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VIII. EDITOR (Image Editing Unit)

A. Outline

1. Electrical Circuitry

The editor is controlled by the editor controller PCB. The editor controller PCB is a microprocessor and, according to pre-programmed instructions, it reads points pressed by a cordless pen on a plane-shaped resistor, and sends inputs to the copier as necessary.

2. Communication with the Copier

The editor communicates with the copier in serial as shown in Figure 3-112. The editor is supplied with power by the Copier, and the editor controller PCB converts 5 VDC to 3.5 VDC.

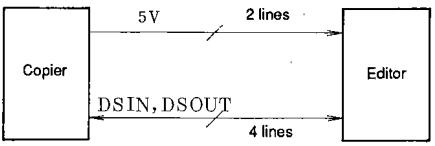

Figure 3-112

3. Inputs to and Outputs from the Editor Controller PCB

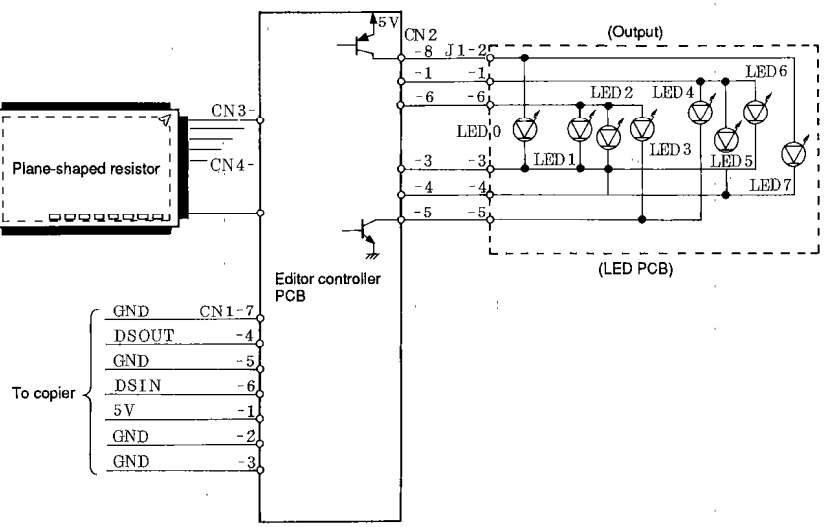

Figure 3-113

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4. Basic Construction of Editor

The editor consists of a tablet and a cordless pen.

Figure 3-112 shows the basic construction of the tablet. As shown in Figure 3-112A, the table consists of several layers, i.e, from above, a protection sheet, X plane-shaped resistor, Y plane-shaped resistor, and fixed plate.

The Y plane-shaped resistor is equipped with bosses called dot spacers. These dot spacers are arranged over the Y plane-shaped resistor and serve to prevent contact with the X plane-shaped resistor when the table is free of pressure.

The editor controller reads points pressed by the cordless pen in the form of settings or function key information.

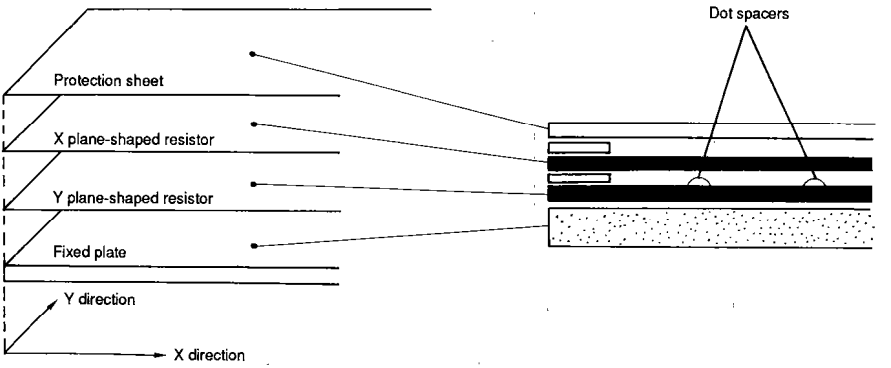

Figure 3-114A

Figure 3-114B

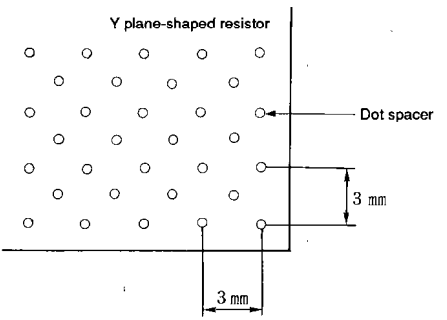

Figure 3-114C

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B. Electrical Circuitry

1. Reading Input Operations

The editor identifies presses made by the cordless pen as explained below.

Figure 3-113 shows the equalizer circuit of the comparator unit; SW is ON, and SW2 through SW4 are OFF.

Inputs of voltage occurring at Ra, Rb, Rc, and Rd are sent to the negative side of the comparator; Rc is a contact resistor.

The reference voltage of the comparator, on the other hand, is divided over R1 and R2 and sent to the positive side.

When a point on the tablet receives more than specific pressure, the contact resistance (Rc) lowers and, as a result, the voltage sent to the negative side of the comparator increases.

The above causes output Vo of the comparator to change from '1' to '0', enabling the microprocessor to know that the tablet was pressed.

2. Reading X Coordinates

Figure 3-115 shows the equalizer circuit of the tablet unit; SW1 and SW2 are ON, and SW3 and SW4 are OFF.

The switches are shifted as shown in Figure 3-116 to lead the voltage between Ra and Rb to the A/D converter, thereby allowing the microprocessor to read the X coordinates.

Since the input impedance of the A/D converter is appreciably large, effects of Rc (contact resistance) on the X coordinates are absent.

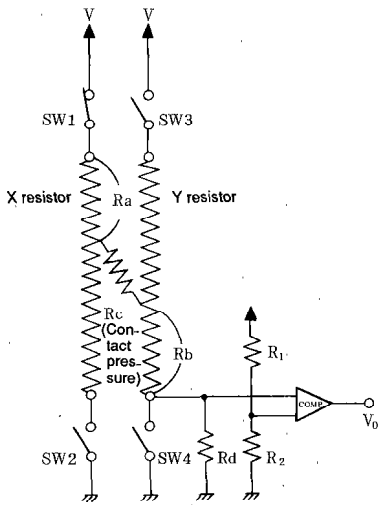

Figure 3-115 Equalizing Circuit of Comparator

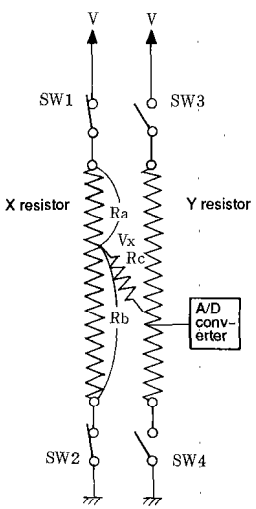

Figure 3-116 Reading X Coordinates

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3. Reading Y Coordinates

The switches are shifted as shown in Figure 3-115 (SW1 and SW2 are OFF, and SW3 and SW4 are ON) to read the Y coordinates as for Y coordinates.

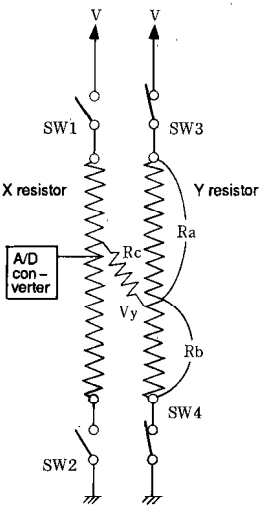

Figure 3-117 Reading Y Coordinates

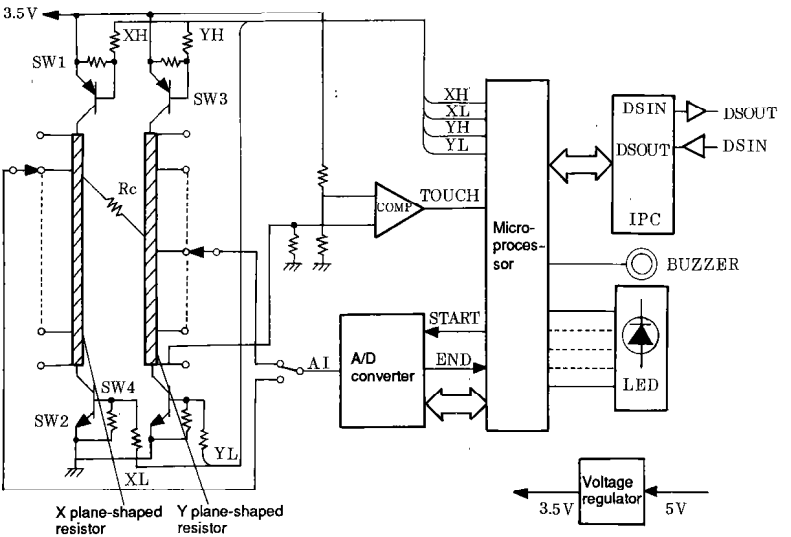

Figure 3-1168 Tablet and Editor Controller (block diagram)

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IX. CD UNIT CHANGER

A. Outline

The copier may be fitted with up to three CD units and sets them in and out as necessary.

For the manual feed mechanism, see p. 3-83.

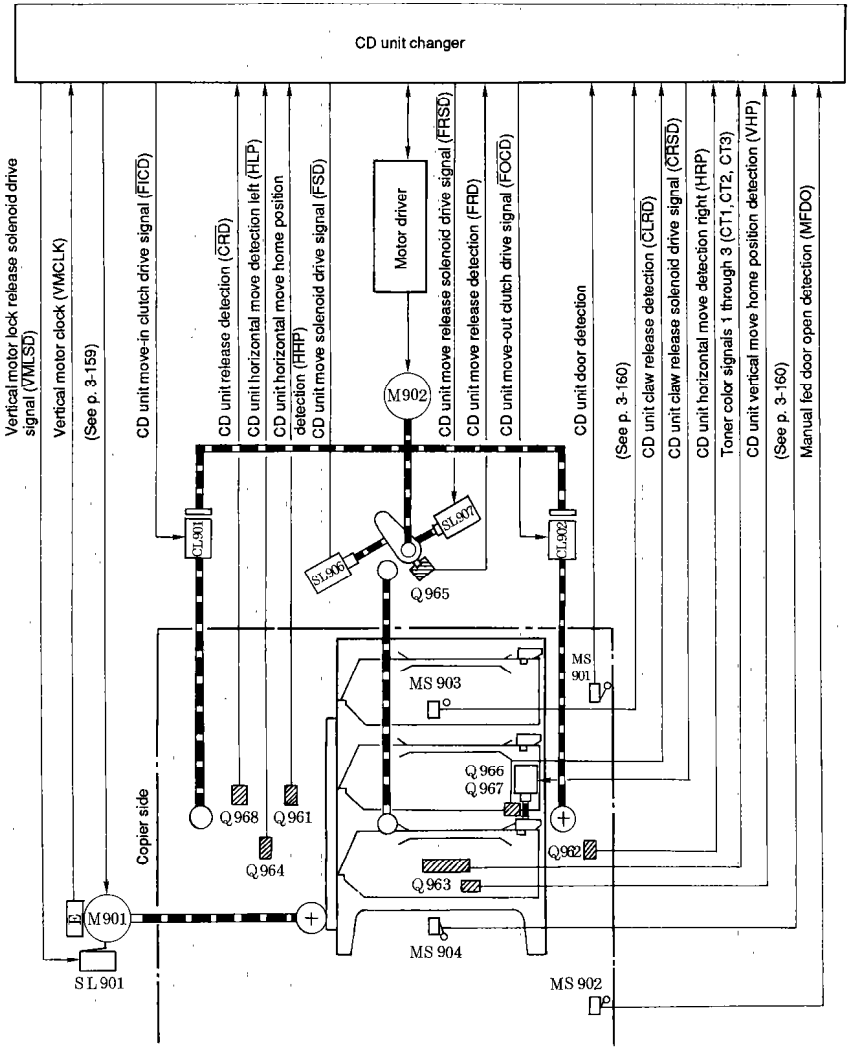

Figure 3-400

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B. Inputs to and Outputs from CD Unit Changer Controller

Inputs to CD Unit Changer Controller

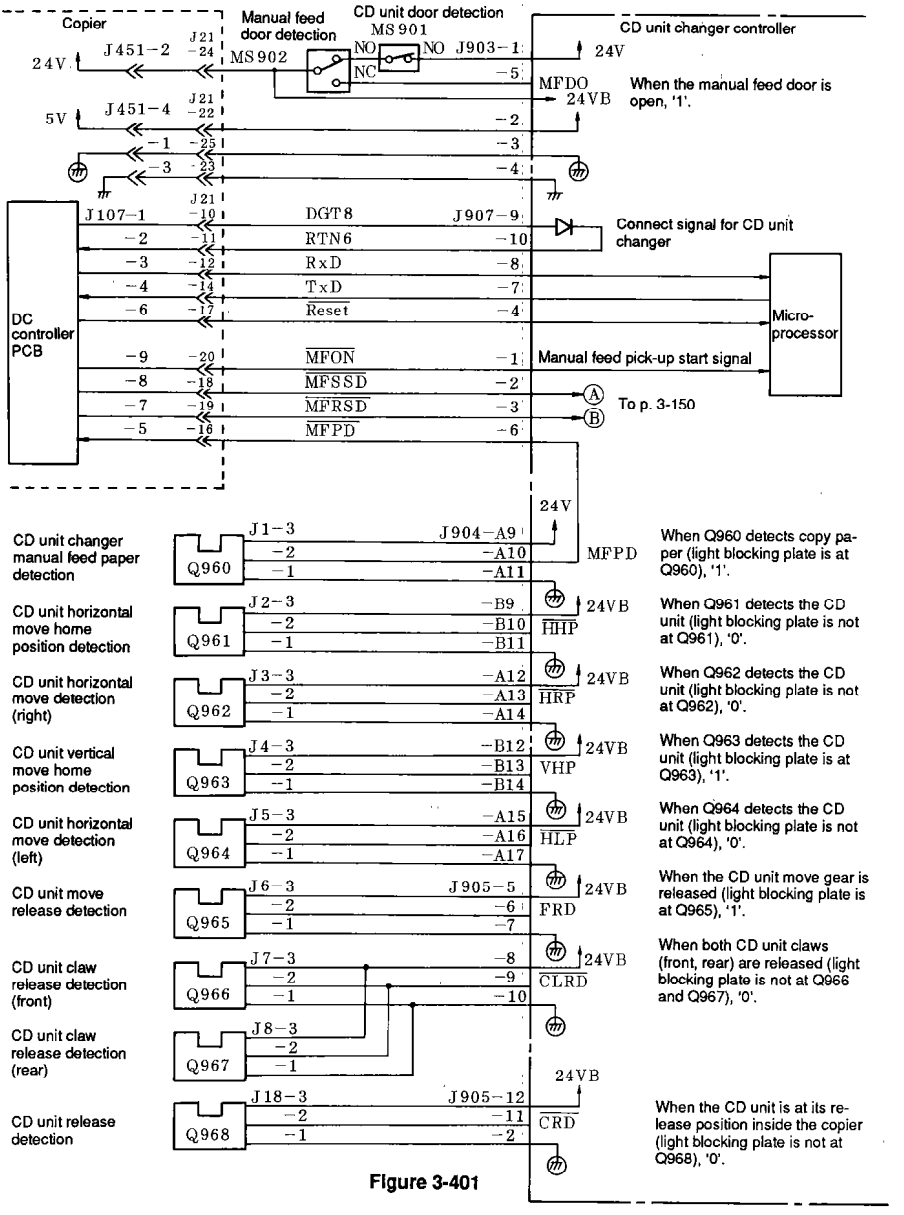

Figure 3-401

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Inputs to CD Unit Changer Controller (continued)

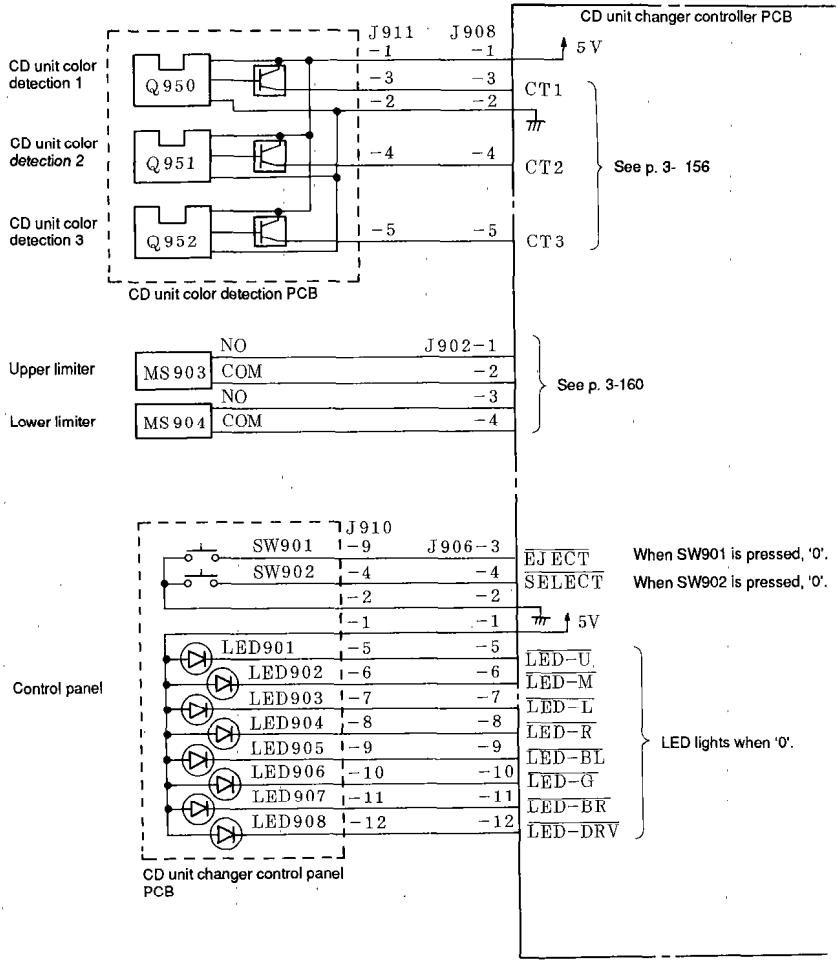

Figure 3-402

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Outputs from CD Unit Changer Controller

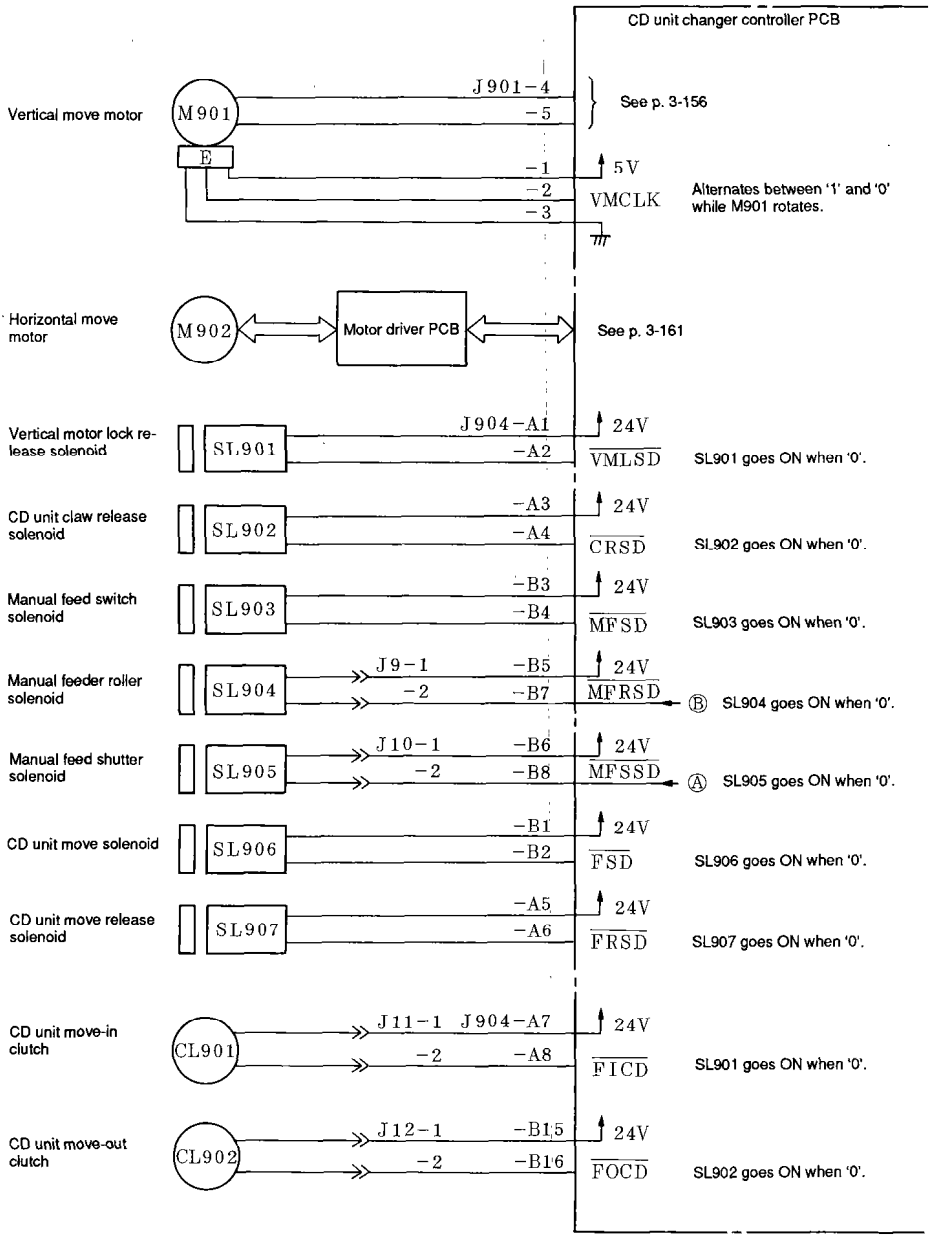

Figure 3-403

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C. Operations at Time of Power ON

When the power is turned ON, the vertical drive motor goes ON to lower the compartment to its bottommost position and then rises to its home position. While the compartment is lowering, it checks the CD unit for the color of its toner.

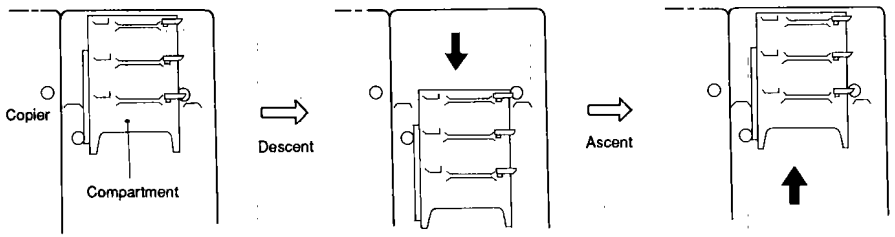
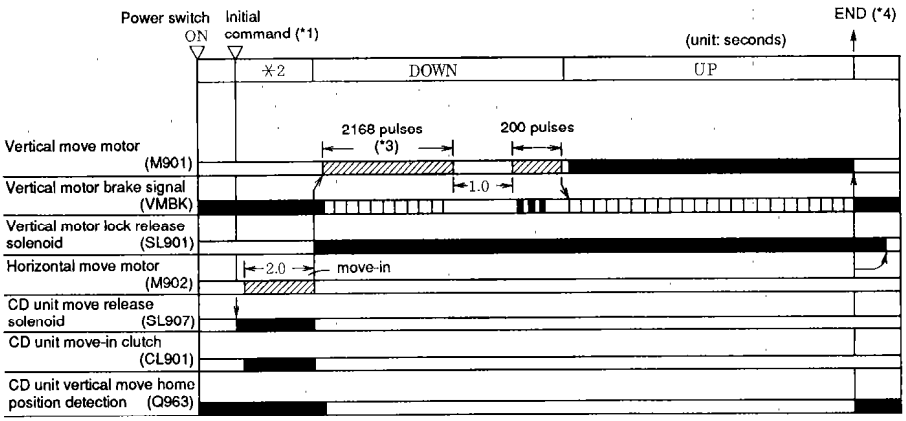


Figure 3-404 At Time of Power ON



*1 Initial operation command sent from copier.
*2 Motor rotated into move-in direction, and CD unit detected by sensors even if in between sensors.
*3 Output from vertical move motor encoder.
*4 Informs copier of completion of operation.

Figure 3-405

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D. Operation at Time of Changing CD Units

The compartment operates as shown in Figures 3-406 to change the CD units inside the compartment.

Figures 3-406 and 3-407 show the operation in which the CD unit inside the copier is moved to the second shelf of the compartment and that on the third shelf is moved to the copier.

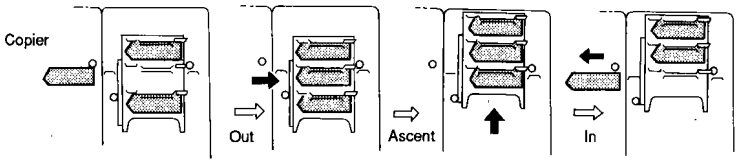
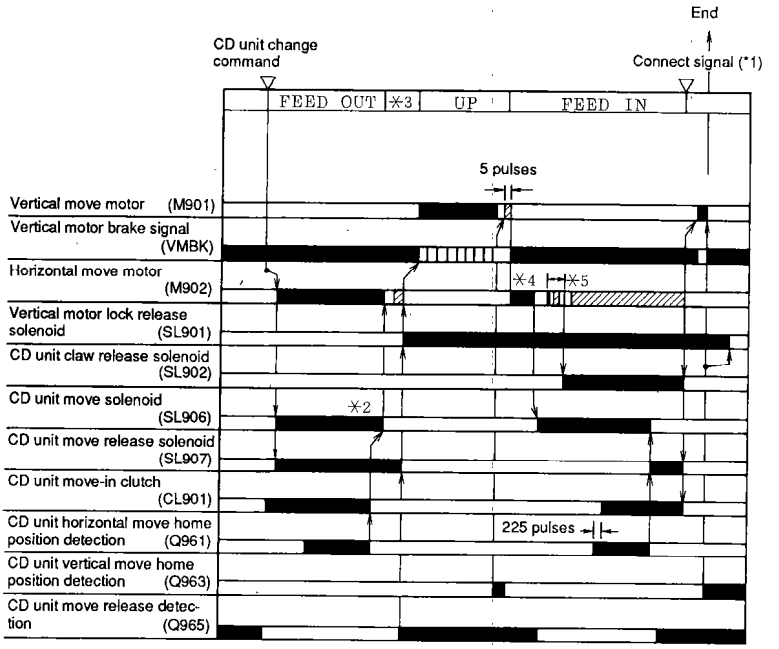


Figure 3-406 CD Units Being Changed



*1 Copier detects connect signal of CD unit.
*2 If claws fail to engage with CD unit, SL906 kept ON to rotate M902 forward and backward unitl engagement.
*3 Releases move gears.
*4 Remove backlash of gear.
*5 Engages gear with CD unit and, further, releases claws.

Figure 3-407

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E. Operation at Time of Supplying Toner

1. CD Unit Empty of Toner

If the CD unit becomes empty of toner during color copy operation, the unit is moved as shown in Figure 3-408; thereafter, the 'ADD TONER' message is indicated on the control panel.

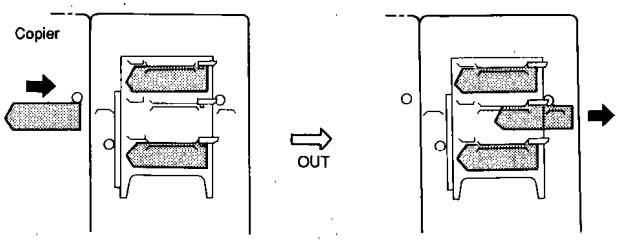
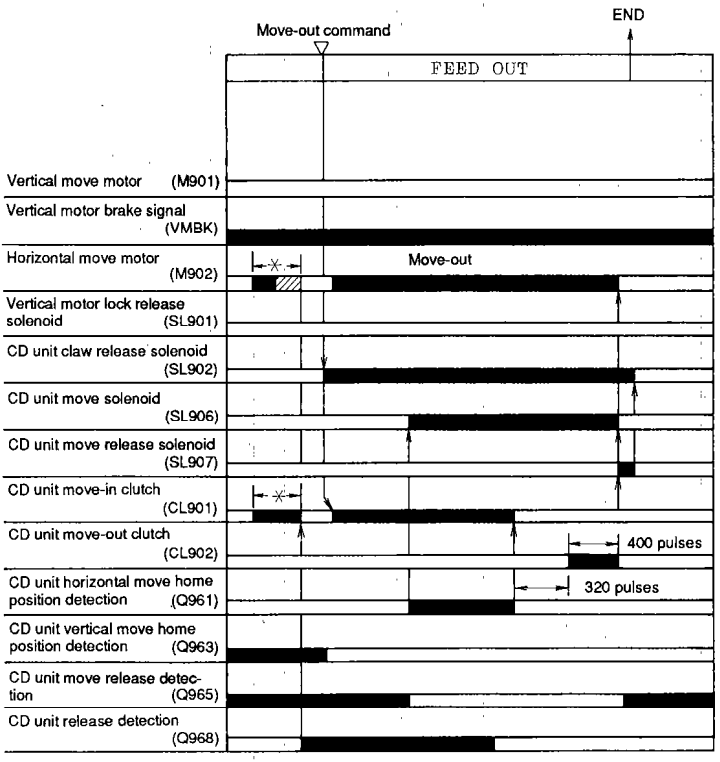


Figure 3-408 Empty CD Unit Being Moved Out


Move-out command
END
FEED OUT
Vertical move motor (M901)
Vertical motor brake signal (VMBK)
Horizontal move motor (M902)
Move-out
Vertical motor lock release solenoid (SL901)
CD unit claw release solenoid (SL902)
CD unit move solenoid (SL906)
CD unit move release solenoid (SL907)
CD unit move-in clutch (CL901)
CD unit move-out clutch (CL902)
400 pulses
CD unit horizontal move home position detection (Q961)
320 pulses
CD unit vertical move home position detection (Q963)
CD unit move release detection (Q965)
CD unit release detection (Q968)

*1 CD unit being released inside copier.

Figure 3-409

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2. CD Unit Door Closed

When the CD unit door is closed after toner is supplied, the CD unit changer stores the CD unit inside the compartment and moves the compartment up and down to check the color of the toner inside the CD unit.

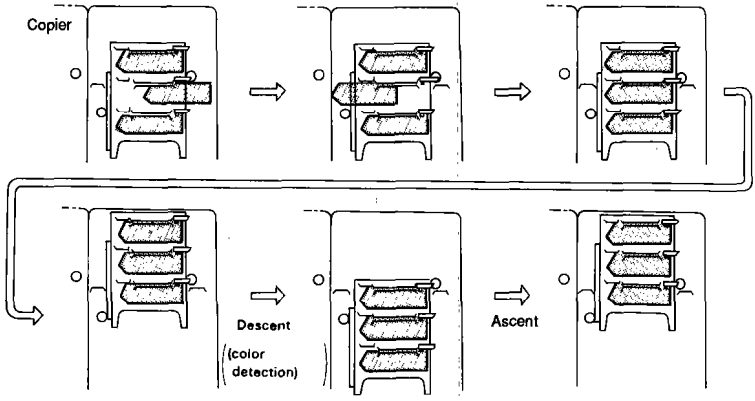
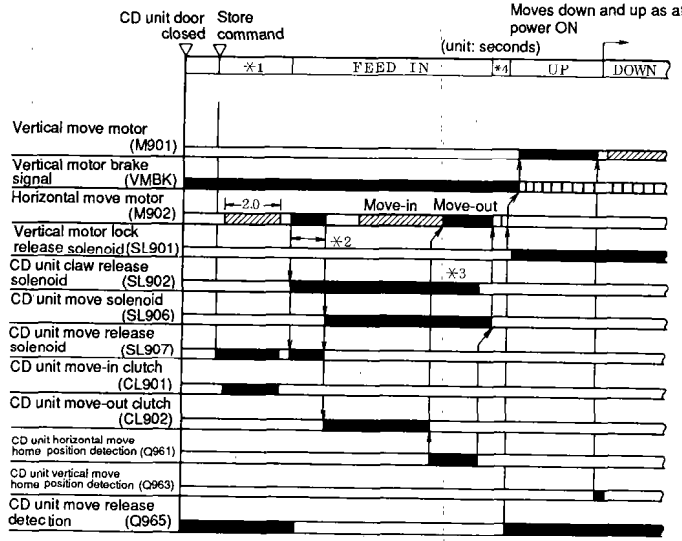


Figure 3-410 CD Unit Door Closed



*1 Motor rotated in move-in direction, and CD unit detected by sensors even if in between sensors.
*2 Remove backlash of gear.
*3 If claws fail to engage with CD unit, SL906 kept ON to rotate M902 forward and backward until engagement.
*4 Engages gear with CD unit and, further, releases claws.

Figure 3-411

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3. COPY START Key ON

When the COPY START key is pressed after toner is supplied and the CD unit door is closed, the CD unit changer operates as shown in Figure 3-412.

If manually fed paper jams, however, the compartment is raised to the topmost position.

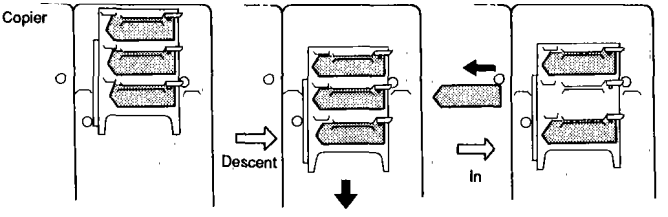
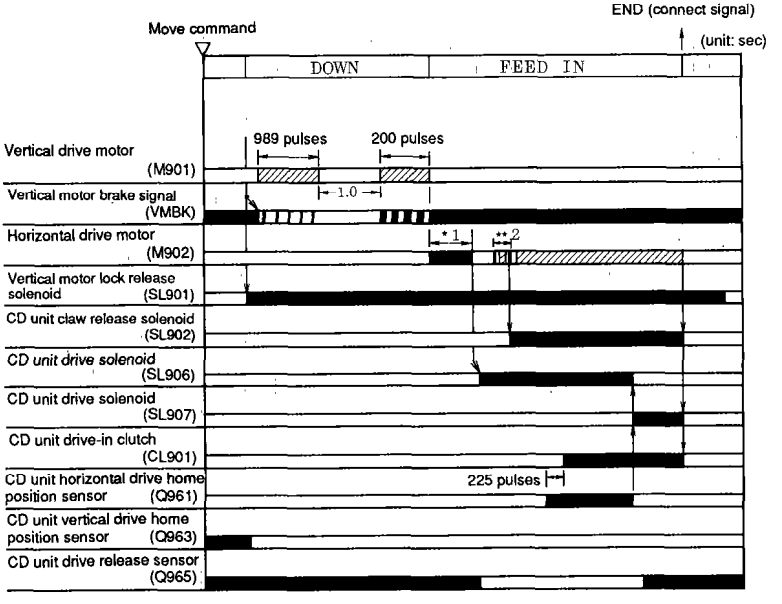


Figure 3-412 COPY START Key ON



*1 Remove backlash of gear.
*2 Engages gear with CD unit, and releases claws.

Figure 3-413

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F. Indentification of Color

The CD unit changer identifies the color of the toner inside CD units based on the combination of the silver and black labels attached to the front of the CD units.

Signal / Label	Red	Blue	Green	Brown	CD unit absent
CT1	0	1	0	1	1
Lable left	Silver	Black	Silver	Black	Absent
CT2	0	0	1	1	1
Lable middle	Silver	Silver	Black	Black	Absent
CT3	0	0	0	0	1
Lable right	Silver	Silver	Silver	Silver	Absent

Table 3-400

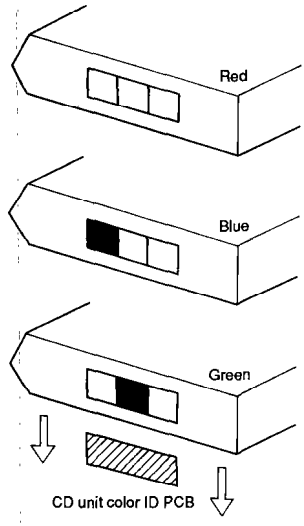

Figure 3-414

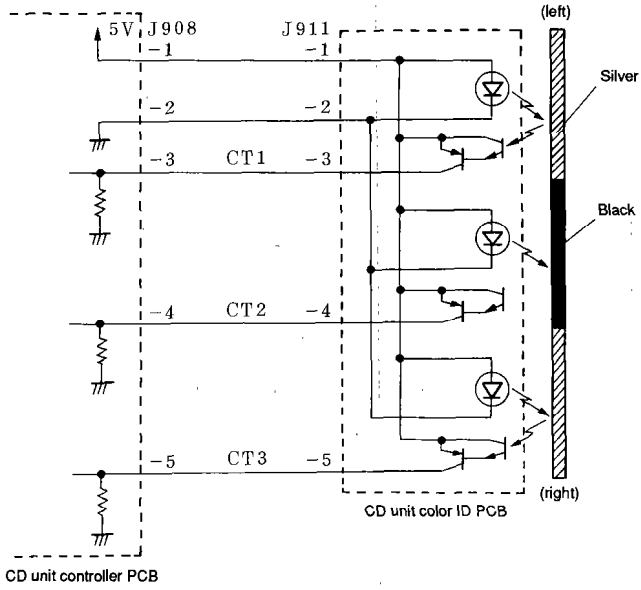

Figure 3-415

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G. Engagement and Disengagement of Move Gear

To move the CD unit in horizontal direction, the move gear is engaged with the CD unit to transmit drive from the horizontal drive motor. In moving the compartment in vertical direction, the feeder gear is disengaged to prevent interference between the compartment and the move gear.

■ When Engaging

The CD unit drive solenoid (SL906) goes ON, and the drive gear is pushed against the CD unit. The plunger of the CD unit drive release solenoid (SL907) is pulled by a spring, and the drive gear is locked by a pin.

■ When Disengaging

SL906 goes OFF, and SL907 goes ON. The pin moves out of the locking position, and the drive gear in turn is disengaged. At the time, the CD unit drive release sensor (Q965) is blocked by the light-blocking plate, enabling identification of the disengagement, that the drive gear is disengaged.

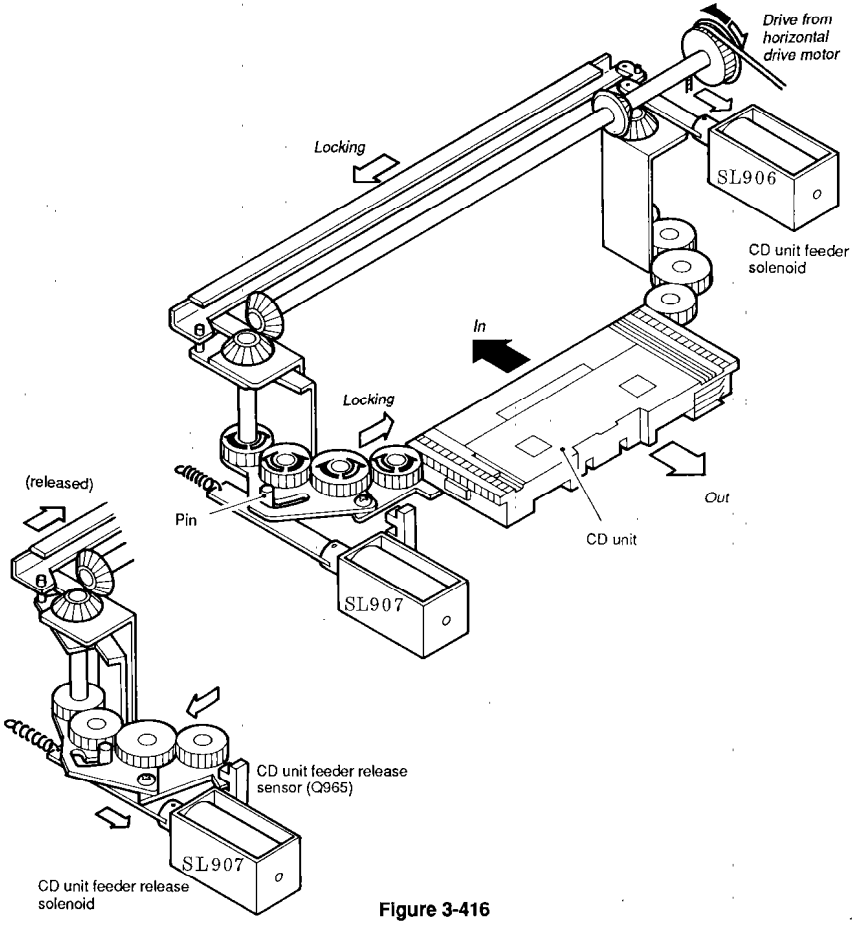

Figure 3-416

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H. Releasing the CD Unit Claw

While inside the compartment, the CD unit is locked by claws located at the front and the rear.

When the CD unit moves in horizontal direction, the CD unit claw release solenoid (SL902) goes ON, and the claws are pushed up. At the time, the CD unit claw release sensors (Q966, Q967) become free of the light-blocking plate, enabling identification of the disengagement.

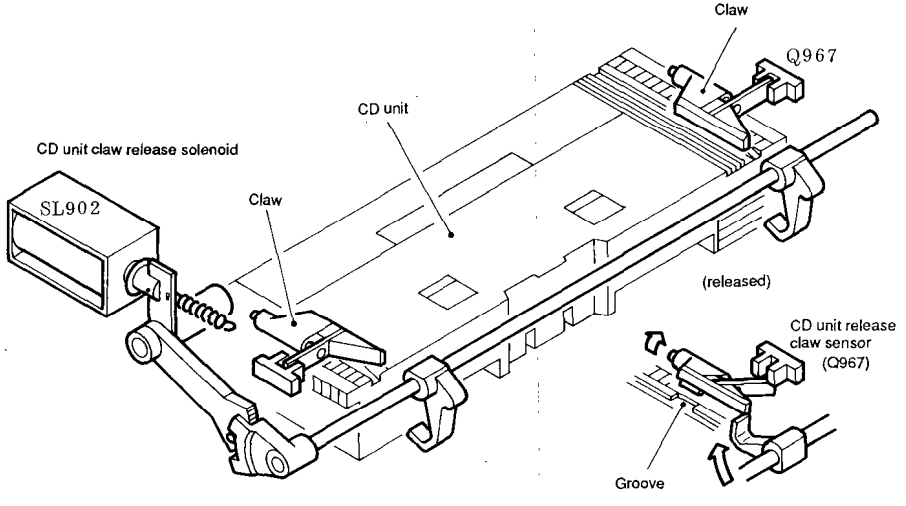

Figure 3-417

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I. Motor Drive Circuit for Vertical Move

The circuit controls the horizontal drive motor, which moves the compartment up and down; it controls the direction of the motor based on the states (ON/OFF) of the following signals:

- VMUP: vertical drive motor up
- VMDWN: vertical drive motor down signal
- VMBK: vertical motor drive brake signal

■ Ascent

VMUP=1, VMDWN=0
└→Transistor A ON
Transistor B OFF
└→Transistors D and G ON
Transistors E and F OFF

The above condition moves the current into the direction of ➡ (Figure 3-418), and the motor rotates for ascent direction.

■ Descent

VMUP=0, VMDWN=1
└→Transistor A OFF
Transistor B ON
└→Transistors D and G OFF
Transistors E and F ON

The above condition moves the current into the direction of ⇨ (Figure 3-418), and the motor rotates for descent direction.

■ Braking

VMBK=1
└→Transistor C ON
└→Transistors E and G OFF

The above condition causes both terminals of the motor to short-circuit, applying the brakes.

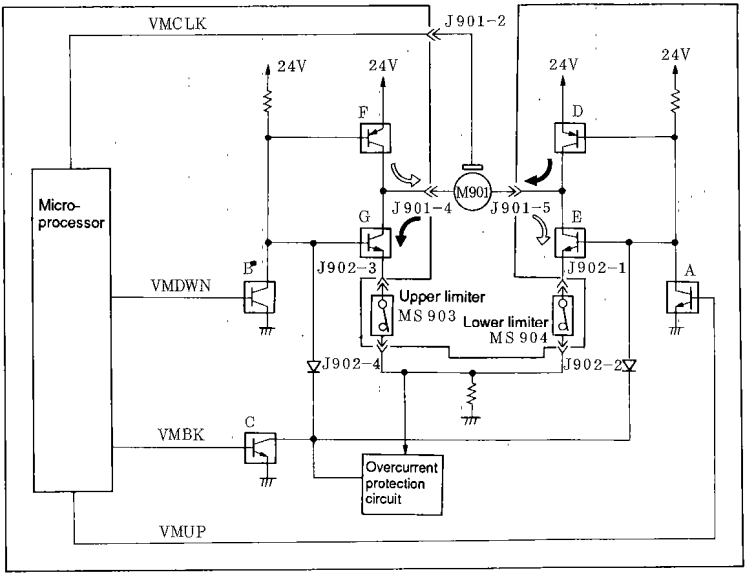

Figure 3-418

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If an overcurrent flows into the circuit for some reason (short circuit, etc.), the overcurrent protection circuit goes ON; this causes transistors D and F to go ON and transistors E and G to go OFF regardless of the state of VMUP or VMDWN.

The CD unit changer controller sends 'E081' if the vertical motor clock (VMCLK) remains '1' or '0' for more than a specific period of time.

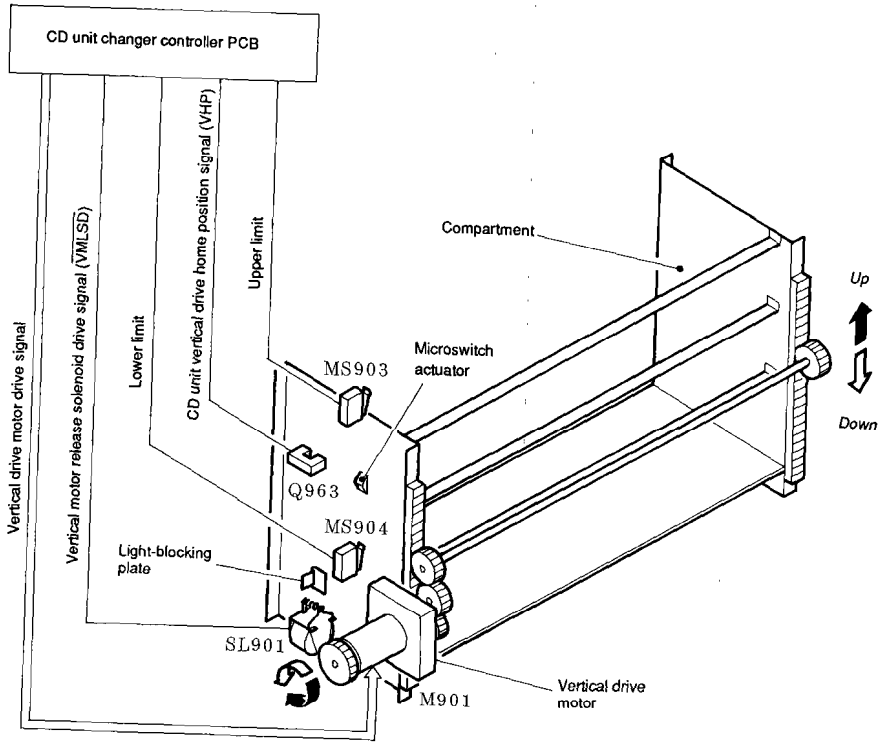

Figure 3-419

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J. Motor Drive Circuit for Horizontal Movement

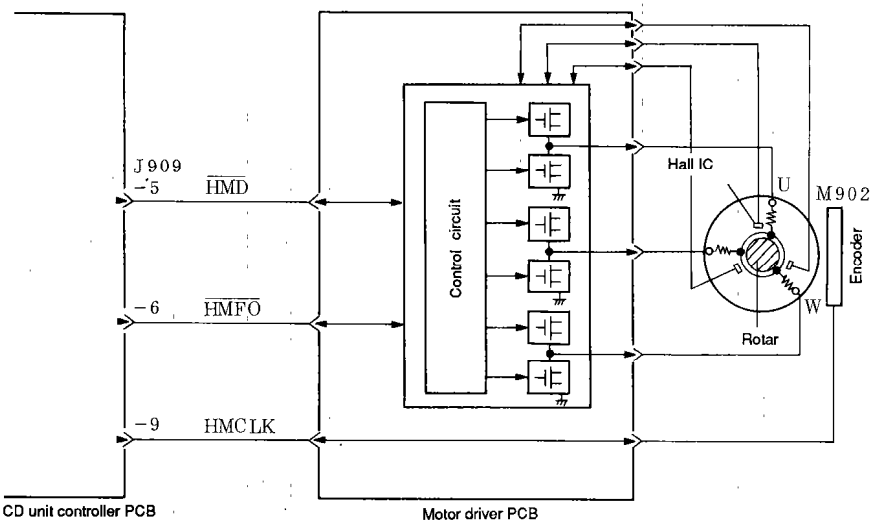
Figure 3-420 shows the circuit used to control the horizontal drive motor (M902), which moves the CD unit in horizontal direction. It turns the motor ON and OFF as well as controls the direction of its rotation.

- Horizontal motor drive signal ($\overline{HMD}$)
- Horizontal motor drive out signal ($\overline{HMFO}$)

The motor is a 3-phase motor and, when $\overline{HMD}$=0, the control circuit turns pulse signals U, V and W ON in sequence, based on the clock pulses from the hall IC to rotate the motor.

The control circuit controls the sequence by which the pulse signals are turned ON according to the '1' and '0' states of $\overline{HMFO}$, thereby determining the direction of motor rotation.

The CD unit changer controller indicates 'E082' on the control panel if the horizontal motor clock (HMCLK) remains '1' or '0' for more than a specific period of time.



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X. SERVICE MODE

A. Outline

The machine's service mode is divided into the following six modes:

Item	Display	Description
1	DISPLAY	control display mode
2	I/O DISPLAY	I/O display mode
3	ADJUST	adjustment mode
4	FUNCTION	function/inspection mode
5	USER OPTION	machine settings mode
6	COUNTER	counter mode

Table 3-500

B. Using the Service Mode

1) Open the front door, and insert the door switch actuator. To check items under 'I/O display mode' while making copies, set the desired copy mode.
2) Press the service mode switch (SW501) using a hex key.
   - The machine enters the service mode and indicates '$' on its display.

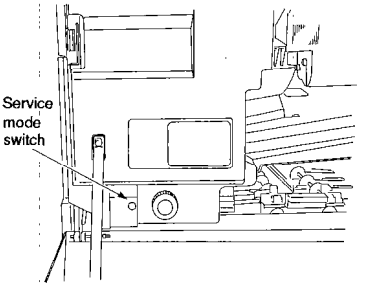

Figure 3-501

3) Enter the No. of the mode (Table 3-500) using the [*] key and the numeric keypad; e.g., press [*], [3], and then [*].
   - The display shows the service mode screen.
4) Press the [△] key or [▽] key to select the desired screen.
5) Make checks or adjustments.
6) Press the RESET key to clear the service mode screen.
7) Press the RESET key once again to leave the service mode.

Note:
Making copies while the service mode screen is displayed slows down the copying operation.

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To ensure that the service modes will be used correctly, the first screen of each mode indicates explanations of the mode together with available keys.

See Figure 3-501 for a sample screen (*3*).

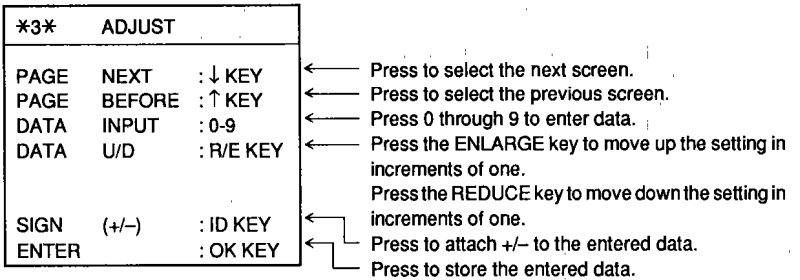
3 ADJUST
PAGE NEXT : ↓ KEY
PAGE BEFORE : ↑ KEY
DATA INPUT : 0-9
DATA U/D : R/E KEY
SIGN (+/–) : ID KEY
ENTER : OK KEY
Press to select the next screen.
Press to select the previous screen.
Press 0 through 9 to enter data.
Press the ENLARGE key to move up the setting in increments of one.
Press the REDUCE key to move down the setting in increments of one.
Press to attach +/– to the entered data.
Press to store the entered data.

Figure 3-501

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C. Using the Adjustment Mode and the Settings Mode

In the adjustment mode and the settings mode, the settings entered from the control panel will be stored in the RAM on the DC controller PCB; once stored, they will be available to serve the functions of VRs and switches.

Figure 3-502 shows the label attached behind the copier's front door.

Each copier is individually adjusted at the factory, and the settings are recorded on the label.

If the DC controller PCB has been replaced or the RAM has been cleared, it is important that the settings recorded on the label be entered; the DC controller available as a service part holds standard settings. Record all new settings made in the field.

If the ROM has been replaced, simply check the settings; it is often not necessary to enter new settings.

	TYP		
LIGHT_BK			
LIGHT_R			
AE_SLOP			
REGIST			
LE_BLANK			
SI_BLANK			
BRAKE_SC			
GRID_N			
GRID_P			
BIAS_N			
BIAS_C			
BIAS_P			
BIASCCD			
BIASMKR			
TRN_1			
TRN_2			
TRN_C			
SEP_1			
SEP_2			
CHARACTE			
REDTHICK			
SHADE			
SCREEN			
BOOK_ERA			
AD_P			

	TYP		
AD_A			
OL2_XM_S			
OL2_XM_L			
LSR_ORGN			
CCD_ORGN			
LSR_X_D			
LSR_Y_D			
LSR_YM_D			
LSR_X_R			
LSR_Y_R			
LSR_YM_R			
LSR_X_E			
LSR_Y_E			
LSR_YM_E			
BIAS_BL			
BIAS_GR			
BIAS_BR			
SZ1_ADJ			
SZ2_ADJ			
SZ3_ADJ			
BK_BELT			
DOC_STOP			

Figure 3-502

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D. Control Display Mode (✱ 1 ✱)

Select the desired screen using the △ and ▽ keys.

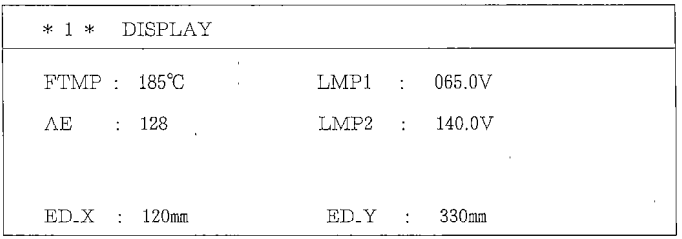

Figure 3-503 DISPLAY1

Item	Description	Remarks
TEMP	surface temperature of the upper fixing roller (output of thermistor)	unit: °C
AE	density of the document (output of CCD)	0 to 255
LMP1 LMP2	ON voltage of the scanning lamp LMP1: 100/115V models LMP2: 220/240V models	unit: V
ED_X ED_Y	editor input coordinates ED_X: X direction ED_Y: Y direction	unit: mm

Table 3-501

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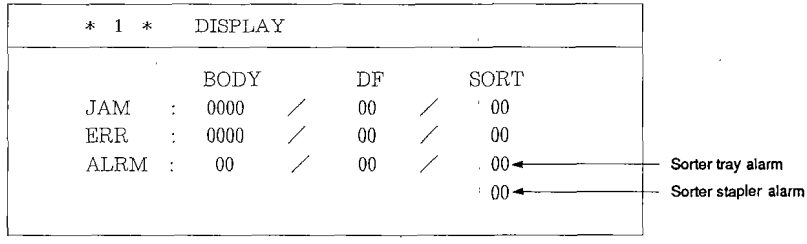

Figure 3-504 DISPLAY2

Item	Description	Remarks
JAM	Location of jam BODY: copier (Table 3-503) DF: RDF-B1 (Table 3-504) SORT: Sorter, Stapler Sorter, Stapler Folder (Table 3-504)	flashes*
ERR	Results of self diagnosis (Tables 3-506, -507).	flashes*
ALRM	Warning (Tables 3-508, -509, -510, -511) EX 'SET DOCUMENT AGAIN'	flashes*

* Indicates the previous condition if the machine is reset by switching OFF and then ON.

Table 3-502

Code	Type of jam	Code	Type of jam
0000	door open during copying*	0100	delay jam at lower feeder inlet (Q3)
0001	delay jam at No. 3 pre-registration (Q16)	0200	timing/stationary jam at lower feeder inlet (Q3)
0002	timing/stationary jam at No. 3 pre-registration (Q16)	0400	delay jam at lower feeder outlet (Q14)
0004	delay jam at No. 2 pre-registration (Q15)	0800	timing/stationary jam at lower feeder outlet (Q14)
0008	timing/stationary jam at No. 2 pre-registration (Q15)	1000	delay jam at No. 4 pre-registration (Q854)/left feeder assembly (Q753)
0010	delay jam at No. 1 pre-registration (Q5)	2000	timing/stationary jam at No. 4 pre-registration (Q854)/left feeder assembly (Q753)
0020	timing/stationary jam at No. 1 pre-registration (Q5)	4000	delay jam at manual feed (Q4)
0040	delay jam at delivery (Q2)	8000	timing/stationary jam at manual feed (Q4)
0080	timing/stationary jam at delivery (Q2)	FFFF	paper over sensor at power-on

* For details, see '02' and '03' of Table 3-508.

Table 3-503 BODY (copier)

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Code	Description
01	document is pulled out at time of pick-up
02	delay jam identified by pick-up sensor
03	delay jam identified by registration/skew sensor
04	leading edge skew jam identified by registration/skew sensor
05	stationary jam identified by registration/ skew sensor
06	double feeding identified by registration/ skew sensor
07	trailing edge skew jam identified by registration/skew sensor
09	leading edge bend identified by registration/skew sensor
11	delay jam 1 identified by reversal sensor
12	stationary jam identified by reversal sensor
13	delay jam 2 identified by reversal sensor
20	initial stationary jam identified by reversal sensor
21	reversal pick-up delay jam identified by registration/skew sensor
22	reversal leading edge skew jam identified by registration/skew sensor
23	reversal pick-up stationary jam identified by registration/skew sensor
24	reversal trailing edge skew jam identified by registration/skew sensor
26	leading edge bend at time of reversal/ pick-up identified by registration/skew sensor
41	delay jam identified by delivery sensor
42	stationary jam identified by delivery sensor
81	DF open
82	pick-up tray or upper cover open
83	delivery document not detected by document sensor
84	document detected by sensor at pick-up

Code	Description
85	jam unique to test mode
86	tray guide narrower than delivery document width at delivery
87	double feeding of document (double feeding detection ON)
88	document detected at pick-up of 1st document
89	recycle lever malfunction during document circulation (2nd or later)

Table 3-504 RDF

Code	Description
01	delay jam identified by folded paper sensor
02	stationary jam identified by folded paper sensor
03	delay jam identified by paper sensor
04	stationary jam identified by paper sensor
05	timing jam identified by paper sensor
06	staple jam
07	paper detected by sensor at power-on
08	joint switch or cover switch OFF during copying operation
0A	stationary jam on stapler tray
0B	stapler safety mechanism ON

Table 3-505 Sorter

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Code	Description
01	E401 ON signal
02	E402 ON signal
03	E403 ON signal
04	E404 ON signal
11	E411 ON signal

Table 3-506 RDF Error

Code	Description
10	E510 ON signal
11	E511 ON signal
12	E512 ON signal
14	E514 ON signal
20	E520 ON signal
30	E530 ON signal
31	E531 ON signal
35	E535 ON signal
40	E540 ON signal
41	E541 ON signal

Table 3-507 Sorter Error/Code

Code	Description
02	right door open
03	lower right door open
10	horizontal registration error
30	cleaning belt out
40	waste toner full
61	primary corona wire cleaning error*
62	transfer/separation corona wire cleaning error*
63	primary, transfer/separation corona wires (both) cleaning error*

* The alarm data will be retained in memory until cleared in the user mode (* 11 OK); during the period, the corona wire cleaning mechanism will be prohibited

Table 3-508 Alarm (copier)

Code	Description
01	recycle lever idle swing
02	document edge sensor does not detect document
03	separation fails at document pick-up
04	skew at document pick-up
05	document overrides stop plate at document pick-up
11	document count different after jam removal
12	document count excess
13	document pulled out during operation

The above data are sent to the copier when the RDF detects misplacement of the document.

Table 3-509 Alarm (RDF)

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Code	Description
01	paper folder unit power OFF
02	overstacking

Table 3-510 Alarm (sorter tray)

Code	Description
01	stapler down
02	staple jam
05	stapler overstacking
06	stapler full stacking
07	mixed paper size (horizontal)
08	stapler unit absent
09	stapled paper in bin
0A	staple out

Table 3-511 Alarm (sorter stapler)

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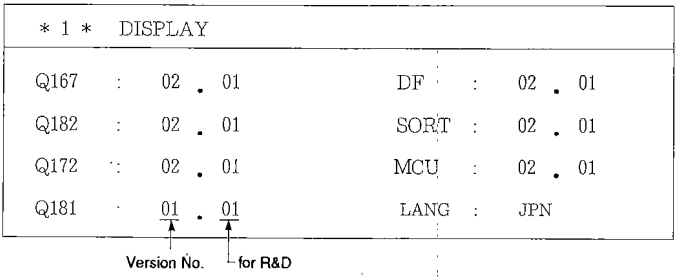

Figure 3-505 DISPLAY3

Item	Description	Remarks
	indicates the version and language for each ROM.	
Q167	indicates the version of the ROM for sequence.	
Q182	indicates the version of the ROM for sequence.	
Q172	indicates the version of the ROM for messages.	
Q181	indicates the version of the ROM for subsequence.	
DF	indicates the version of the ROM for the RF.	
SORT	indicates the version of the ROM for the sorter.	
MCU	indicates the version of the ROM (Q905) for the CD unit changer.	
LANG	indicates the language.	

Table 3-512

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```
 * 1 * DISPLAY

KEY_CHK    : 00
DF_SIZE    : A4
```

Figure 3-506 DISPLAY4

Item	Description	Remarks
KEY _ CHK	indicates the key code in response to the respective key (except RESET, up/down key); for the key codes, see Table 3-514.	
DF_SIZE	indicates the size of the last document identified by the RDF; for document sizes, see Table 3-515.	

Table 3-513

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Code	Name	Code	Name
00H	numeric keypad 0	20H	M1 key (copy mode memory)
01H	numeric keypad 1	21H	M2 key (copy mode memory)
02H	numeric keypad 2	22H	M3 key (copy mode memory)
03H	numeric keypad 3	23H	STANDBY key
04H	numeric keypad 4	24H	ID key
05H	numeric keypad 5	25H	AUTOMATIC COLOR REPRODUCTION key
06H	numeric keypad 6		
07H	numeric keypad 7	26H	FOLD key
08H	numeric keypad 8	27H	SORT/STAPLE/GROUP key
09H	numeric keypad 9	28H	PHOTO key
0AH	AE key	29H	MARGIN key
0BH	* key	2AH	CORRECT key
0CH	OK key	2BH	AREA key
0DH	CLEAR/STOP key	2CH	DATE/TIME key
0EH	RESET key*	2DH	COLOR EDIT key
0FH	COPY START key	2EH	FRAME ERASE key
10H	DIRECT key	2FH	NUMBERING key
11H	OVERLAY MODE key	30H	FREEHAND key
12H	TWO-SIDED MODE key	31H	ERASE key
13H	TWO-PAGE SEPARATION MODE key	32H	INTERRUPT key
		33H	MC key
14H	COLOR key		
15H	ENLARGE key		
16H	REDUCE key		
17H	PAPER SELECT key		
18H	GUIDE key		
19H	AUTO ZOOM key		
1AH	UP SHIFT key**		
1BH	DOWN SHIFT key**		
1CH	DARKER key		
1DH	LIGHTER key		
1EH	ZOOM (+) key		
1FH	ZOOM (–) key		

* Returns to the standard screen when the RESET key is pressed.
** Returns to the previous/next screen when up/down key is pressed.

Table 3-514 Key Codes

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Code	Document size	(unit: mm)
B5	B5	182 × 257
FOOLSCAP	FOOLSCAP	330 × 216
A4	A4	210 × 297
B5R	B5R	257 × 182
B4	B4	364 × 257
A4R	A4R	297 × 210
A3	A3	420 × 297
STMT	STATEMENT	140 × 216
LTR	LETTER	216 × 279
LGL	LEGAL	356 × 216
LTRR	LETTER-R	279 × 216
11" × 17"	11" × 17"	432 × 279
A5	A5	148 × 210
COMPUTER	Computer form	381 × 279

Table 3-515 Document Sizes

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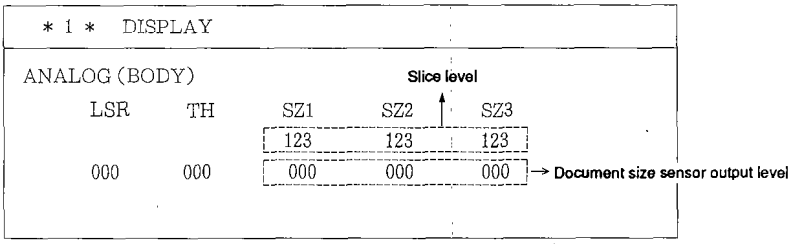

Figure 3-507 DISPLAY5

Microprocessor Input Level (analog signals)

Item	Display	Display	Remarks
ANALOG (BODY; copier)	LSR	Laser output level	000: 0V
	TH	thermistor output level	255: 5V
	SZ1	document size sensor output level	
	SZ2	document size sensor output level	
	SZ3	document size sensor output level	

Table 3-516

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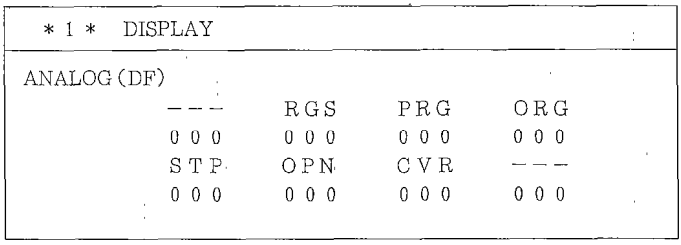

Figure 3-508 DISPLAY6

Microprocessor Input Level (analog signals)

Item	Display	Display	Remarks
ANALOG (DF; RDF-B1 in use)	—	reserved	000: 0V 255: 5V
	RGS	registration sensor output level	
	PRG	pre-registration sensor output level	
	ORG	document sensor output level	
	STP	document stop position volume	
	OPN	RDF switch output	
	CVR	upper cover switch output	
	—	reserved	

Table 3-517

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```
 * 1 *  DISPLAY

ANALOG (SORT)
          AD 0    AD 1    AD 2    AD 3
          0 0 0   0 0 0   0 0 0   0 0 0
          AD 4    AD 5    AD 6    AD 7
          0 0 0   0 0 0   0 0 0   0 0 0
```

Figure 3-509 DISPLAY7

Microprocessor Input Levels (analog) <Stapler Sorter-A1/Soter-B1>

<table>
<tr><th>Item</th><th>Display</th><th>Remarks</th></tr>
<tr><td>AD0</td><td>Output of bits 3 and 4 (DIP switch; SW1)</td><td>
<table>
<tr><th>Display</th><th>Bit 3</th><th>Bit 4</th></tr>
<tr><td>000 — 115</td><td>ON</td><td>ON</td></tr>
<tr><td>116 — 151</td><td>OFF</td><td>ON</td></tr>
<tr><td>152 — 215</td><td>ON</td><td>OFF</td></tr>
<tr><td>216 — 255</td><td>OFF</td><td>OFF</td></tr>
</table>
</td></tr>
<tr><td>AD1</td><td>Output of bits 1 and 2 (DIP switch; SW1)</td><td>
<table>
<tr><th>Display</th><th>Bit 1</th><th>Bit 2</th></tr>
<tr><td>000 — 115</td><td>ON</td><td>ON</td></tr>
<tr><td>116 — 151</td><td>OFF</td><td>ON</td></tr>
<tr><td>152 — 215</td><td>ON</td><td>OFF</td></tr>
<tr><td>216 — 255</td><td>OFF</td><td>OFF</td></tr>
</table>
</td></tr>
<tr><td>AD2</td><td>Output of bin unit UP/DOWN switch (SW2/SW3)</td><td>
<table>
<tr><th>Display</th><th>SW2(UP)</th><th>SW3(DOWN)</th></tr>
<tr><td>000 — 115</td><td>ON</td><td>ON</td></tr>
<tr><td>116 — 151</td><td>OFF</td><td>ON</td></tr>
<tr><td>152 — 215</td><td>ON</td><td>OFF</td></tr>
<tr><td>216 — 255</td><td>OFF</td><td>OFF</td></tr>
</table>
</td></tr>
<tr><td>AD3</td><td>For factory</td><td></td></tr>
<tr><td>AD4</td><td>Output of Staple sentor (PI 13)</td><td>000 — 092: staple present
093 — 255: staple absent</td></tr>
<tr><td>AD5</td><td>Reserved</td><td></td></tr>
<tr><td>AD6</td><td>Output of bin inside paper sensor (PT1)</td><td>000 — 103: paper present
104 — 255: paper absent</td></tr>
<tr><td>AD7</td><td>Level of 24 power</td><td>000 — 191: power out
192 — 255: returns to normal</td></tr>
</table>

Table 3-518A

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Microprocessor Input Levels (analog) <AUTO Stapler Folder-A1>

<table>
<tr><th>Item</th><th>Display</th><th>Remarks</th></tr>
<tr><td>AD0</td><td>Level of 24V power</td><td>000 — 127: 24V not detected
128 — 255: 24V detected</td></tr>
<tr><td>AD1</td><td>Joint sensor (MS2) and stapler cover open/closed sensor (MS5).</td><td><table><tr><th>Display</th><th>Bit 1</th><th>Bit 2</th></tr><tr><td>000 — 063</td><td>CLOSE</td><td>CLOSE</td></tr><tr><td>064 — 190</td><td>CLOSE</td><td>OPEN</td></tr><tr><td>191 — 255</td><td>OPEN</td><td>OPEN</td></tr></table></td></tr>
<tr><td>AD2</td><td>Output of lower left door open/closed sensor (MS2) and AC power supply.</td><td><table><tr><th>Display</th><th>MS2</th><th>AC power supply</th></tr><tr><td>000 — 063</td><td>OPEN</td><td>OFF</td></tr><tr><td>064 — 190</td><td>CLOSE</td><td>ON</td></tr><tr><td>191 — 255</td><td>CLOSE</td><td>OFF</td></tr></table></td></tr>
<tr><td>AD3</td><td>Output of swing unit open/closed sensor. (MS3).</td><td>000 — 127: closed
128 — 255: open</td></tr>
<tr><td>AD4</td><td>Output of staple tray paper sensor (PI3).</td><td>000 — 127: paper present
128 — 255: paper absent</td></tr>
<tr><td>AD5</td><td>Reserved</td><td></td></tr>
<tr><td>AD6</td><td>Output of stack tray paper sensor (PI 12).</td><td>000 — 127: paper present
128 — 255: paper absent</td></tr>
<tr><td>AD7</td><td>Output of staple sensor (PT1).</td><td>000 — 127: paper present
128 — 255: paper absent</td></tr>
</table>

Table 3-518 B

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Microprocessor Input Levels (analog) <Sorter-A1>

Item	Display	Remarks
AD0	level of 24V power	000 — 197: 24V not detected 198 — 242: 24V detected
AD1	for factory	
AD2	for factory	
AD3	reserved	
AD4	reserved	
AD5	reserved	
AD6	reserved	
AD7	reserved	

Table 3-518C

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E. I/O Display Mode (✱2✱)

Select the desired screen using the △ and ▽ keys.
The input/output (8 bits) of each port may be checked; each address represents the following:

PA0 to PC6:	main CPU port
SPA to SPF:	sub CPU port
MT6 to MTB:	indicates the states of the switches wired in a matrix (static).
DF0 to DF4:	CPU port on RDF controller PCB
ST0 to ST7:	CPU port on sorter controller PCB
AC0 to AC5:	CPU port on CD unit changer contriler CPU

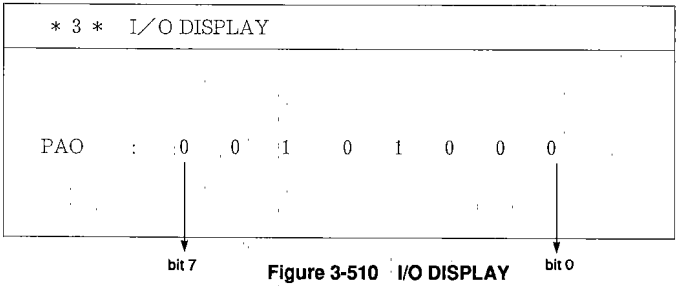

Figure 3-510 I/O DISPLAY

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Address	bit	Signal	Notation	Jack No.	Remarks
PA0 (input)	0	manual feed paper sensor (Q4) signal	MFPD	J109-A7	0: paper present
	1	No. 3 pre-registration paper sensor (Q16) signal	PDP7	J109-A9	1: paper present
	2	No. 4 pre-registration paper sensor (Q854) signal Left feeder assembly paper sensor (Q753) signal	PDP8 LPPDE	J108-A8	0: paper present
	3	No. 2 pre-registration paper sensor (Q15) signal	PDP6	J109-A6	0: paper present
	4	No. 1 pre-registration paper sensor (Q5) signal	PDP1	J104-B5	1: paper present
	5	delivery paper sensor (Q2) signal	PDP3	J110-A4	0: paper present
	6	lower feeder inlet paper sensor (Q3) signal	PDP4	J111-B2	0: paper present
	7	lower feeder outlet paper sensor (Q14) signal	PDP5	J109-A5	0: paper present
PB0 (output)	0	manual feed shutter solenoid (SL9) drive command	MFSSD	J109-B5	1: SL9 ON
	1	No. 1 registration roller clutch (CL1) drive command	RGCD1	J104-B7	1: CL1 ON
	2	No. 2 registration roller clutch solenoid (SL8) drive command	RGSD2	J109-B4	1: SL8 ON
	3	No. 3 registration roller clutch (CL4) drive command	RGCD3	J109-B12	1: CL4 ON
	4	pick-up motor (M803) drive command deck motor (M701) drive command	PUMD DKMD	J108-B5	1: M803/M701 ON
	5	pick-up roller release solenoid 1 (SL7) drive command	PRSD1	J109-B3	1: SL7 ON
	6	pick-up drive switch solenoid 1 (SL6) drive command	PSSD1	J109-B2	1: SL6 ON
	7	pick-up clutch 1 (CL2) drive command	PUCD1	J109-B1	1: CL2 ON
PC0 (output)	0	pick-up clutch 2 (CL801) drive command right pick-up clutch (CL701) drive command	PUCD2 PRUDR	J108-B3	1: CL701/CL801 ON
	1	pick-up drive switch solenoid 2 (SL805) drive command	PSSD2	J108-B2	1: SL805 ON
	2	left pick-up roller release solenoid (SL702) drive signal	LPURL	J108-B11	1: SL702 ON
	3	reserved.			
	4	pick-up roller release solenoid 2 (SL804) drive command right pick-up roller release solenoid (SL701) drive command	PRSD2 PRURL	J108-B4	1: SL701/SL804 ON

Table 3-519A

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Address	bit	Signal	Notation	Jack No.	Remarks
PC0 (output)	5	No. 4 registration roller clutch solenoid (SL802) drive command left feeder drive clutch (CL703) drive command	RGSD4 LPPDR	J108-B1	1: CL703/802 ON
	6	power switch (SW1) OFF command	PWOFF	—	1: SW1 OFF; if error in lamp/heater, PWOFF=0 regardless of the state.
	7	add-on shuther solenoid (SL1) drive signal	ADSA	J110-A1	1: SL1 ON
PA1 (input)	0	cassette 1 lifter position sensor (Q12) signal	C1LTP	J109-A3	1: lifter UP
	1	cassette 2 lifter position sensor (Q13) signal	C2LTP	J109-A4	1: lifter UP
	2	cassette 3 lifter position sensor (Q851) signal	C3LTP	J108-B7	1:lifter UP
	3	cassette 4 lifter position sensor (Q853) signal	C4LTP	J108-A10	1: lifter UP
	4	scanner home position sensor (Q8) signal	SCHP	J114-B5	1: at home position
	5	reserved.			
	6	copyboard cover open/closed sensor (MS2) signal	CBCC	J102-A7	0: closed
	7	reserved.			
PB1 (output)	0	cassette 1 lifter motor (M8) drive command	C1LTMD	J109-A13	1: M8 ON
	1	cassette 2 lifter motor (M9) drive command	C2LTMD	J109-A14	1: M9 ON
	2	cassette 3 lifter motor (M801) drive command	C3LTMD	J108-B8	1: M801 ON
	3	cassette 4 lifter motor (M802) drive command	C4LTMD	J108-A11	1: M802 ON
	4	reserved.			
	5	cleaning belt drive solenoid (SL2) drive command	CLBSD	J111-A5	1: SL2 ON
	6	counter (CNT1, CCV) drive command	CNT1D CCD	J110-B1 J101-B8	0: counter ON
	7	counter (CNT2) drive command	CNT 2D	J110-B3	1: CNT2 ON
PC1 (output)	0	hopper motor (M10) drive command	HMD	J111-A1	1: M10 ON
	1	heat exhaust fan (FM2) drive command	FM2D	J120-2	1: FM2 ON
	2	heat exhaust fan (FM2)/feeder fan (FM3) high-speed rotation command	FM2STB FM3STB	J120-1 J117-1	1: high-speed rotation
		power supply cooling fan (FM4) drive signal	FM4D	J102-B11	1: FM4 ON
	3	scanner cooling fan (FM1) drive command	FM1D	J102-B9	1: FM1 ON

Table 3-519B

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Address	bit	Signal	Notation	Jack No.	Remarks
PC1 (output)	4	feeder fan (FM3) drive command	FM3D	J117-2	1: FM3 ON
	5	main motor (M1), pre-exposure lamp (LA2) drive command	$\overline{\text{MMD}}$ $\overline{\text{PEXP}}$	J102-A5 J102-B1	1: M1, LA2 ON
	6	scanner motor (M2) drive command	$\overline{\text{SCMD}}$	J102-A1	1: M2 ON
	7	scanner forward command	$\overline{\text{SCFW}}$	J102-A2	1: scanner forward
PA2 (input)	0	cassette 1 paper sensor (Q10) signal	C1PD	J109-A1	1: paper present
	1	cassette 2 paper sensor (Q11) signal	C2PD	J109-A2	1: paper present
	2	cassette 3 paper sensor (Q850) signal right deck paper sensor (Q751) signal	$\overline{\text{C3PD}}$ $\overline{\text{RPADE}}$	J108-B6	1: paper present
	3	cassette 4 paper sensor (Q852) signal left deck paper sensor (Q752) signal	$\overline{\text{C4PD}}$ $\overline{\text{LPADE}}$	J108-A9	1: paper present
	4	CD unit changer manual feed paper sensor (Q960) signal	MFPD	J107-5	1: paper present
	5	reserved.			
	6	black toner supply signal (Q17)	$\overline{\text{BTSP}}$	J111-A13	0: black toner supply
	7	control card sensor signal (CCV)	$\overline{\text{CCDT}}$	J111-B7	0: control card present
PB2 (output)	0	D/A converter data 0	DA DATA0	—	
	1	D/A converter data 1	DA DATA1	—	
	2	D/A converter data 2	DA DATA2	—	
	3	reserved.			
	4	reserved.			
	5	reserved.			
	6	scanning lamp (LA1) ON command	$\overline{\text{LRD}}$	J103-A4	1: LA1 ON
	7	fixing heater (H1) ON signal	$\overline{\text{HTRD}}$	J111-B11	1: H1 ON
PC2 (output)	0	delivery motor (M7) FD/RV switch command	DFFW	—	
	1	DP request signal	DPRQ	—	
	2	lower feeder drive command	LFON	—	
	3	CCV count command	CCNTD	J110-B8	O: ON
	4	primary corona wire cleaner reverse command	$\overline{\text{PCLMR}}$	—	1 for-ward 0 / 0 re-verse 1
	5	primary corona wire cleaner forward command	$\overline{\text{PCLMF}}$	—	

Table 3-519C

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Address	bit	Signal	Notation	Jack No.	Remarks
PC2 (output)	6	transfer/separation corona wire cleaner reverse command	$\overline{\text{TCLMR}}$	—	1 ┐ for- ward 0 ┘ 0 ┐ re- verse 1 ┘
	7	transfer/separation corona wire cleaner forward command	$\overline{\text{TCLMF}}$	—	
PA3 (input)	0	key read signal 0	RTN0	J104-A6 J112-4 J108-A7	reads input from switches on control panel
	1	key read signal 1	RTN1	J104-A5 J112-3 J108-A6	
	2	key read signal 2	RTN2	J104-A4 J112-6 J108-A5	
	3	key read signal 3	RTN3	J104-A3 J112-5 J108-A4	
	4	key read signal 4	RTN4	J112-8 J108-A3	
	5	key read signal 5	RTN5	J112-7	
	6	key read signal 6	RTN6	J112-10	
	7	key read signal 7	RTN7	J112-9 J111-B9	
PB3 (input)	0	oscillation signal 0	KDGT0	J112-11	power supply for reading input from switches on control panel
	1	oscillation signal 1	KDGT1	J112-14	
	2	oscillation signal 2	KDGT2	J112-13	
	3	oscillation signal 3	KDGT3	J112-16	
	4	oscillation signal 4	KDGT4	J112-15	
	5	oscillation signal 5	KDGT5	J112-18	
	6	oscillation signal 6	KDGT6	J110-17 J119-74	
	7	oscillation signal 7	KDGT7	J104-A1	
PC3 (output)	0	oscillation signal 8	KDGT8	J104-A2	
	1	oscillation signal 9	KDGT9	J108-A2	
	2	oscillation signal 10	KDGT10	J108-A1	
	3	oscillation signal 11	KDGT11	J121-11	
	4	developing bias AC drive command	$\overline{\text{HVBAC}}$	J103-B8	1: developing bias AC component ON
	5	AC transformer drive command	$\overline{\text{HVAC}}$	J104-A7	1: AC transformer ON
	6	control panel lamp drive command	CPLD	J112-34	1: lamp ON

Table 3-519D

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Address	bit	Signal	Notation	Jack No.	Remarks
PC3 (output)	7	oscillation signal	WATCHDOG1	—	checking erratic error
PA4 (input)	0	CD unit door sensor (MS3) signal	$\overline{\text{CDUDC}}$	J103-B10	0: door closed
	1	manual feed door sensor (MS4) signal	$\overline{\text{MFDC}}$	J109-A8	0: door closed
	2	lower right door sensor (MS703/MS801) signal	$\overline{\text{RLDC}}$ RDODE	J108-B9	0: door closed
	3	scanner motor PLL lock signal	$\overline{\text{M2LK}}$	J102-A4	0: rotation normal
	4	main motor PLL lock signal	$\overline{\text{M1LK}}$	J102-A6	0: rotation normal
	5	SSR error sensor signal	SRER	J103-A5	0: error
	6	waste toner sensor (MS1) signal	$\overline{\text{WTOF}}$	J102-A9	alternately '1' and '0' when drum is full of waste toner.
	7	counter (CNT1) open circuit signal	CNTRERR	J110-B1	1: CNT1 open circuit
PB4 (output)	0	oscillation signal 0	LDGT0	J112-28	control panel LED ON power supply
	1	oscillation signal 1	LDGT1	J112-27	
	2	oscillation signal 2	LDGT2	J112-30	
	3	oscillation signal 3	LDGT3	J112-29	
	4	oscillation signal 4	LDGT4	J112-32	
	5	oscillation signal 5	LDGT5	J112-31	
	6	reserved.			
	7	power check LED ON command	$\overline{\text{PLEDD}}$	J112-33	1: LED ON
PC4 (output)	0	ON signal 0	SEG0	J112-20	control panel LED ON signal
	1	ON signal 1	SEG1	J112-19	
	2	ON signal 2	SEG2	J112-22	
	3	ON signal 3	SEG3	J112-21	
	4	ON signal 4	SEG4	J112-24	
	5	ON signal 5	SEG5	J112-23	
	6	ON signal 6	SEG6	J112-26	
	7	ON signal 7	SEG7	J112-25	
PA5 (input)	0	primary corona wire cleaner home position sensor (MS7)	$\overline{\text{PCLHP}}$	J102-B7	0: HP
	1	transfer/separation corona wire cleaner home position sensor (MS8)	$\overline{\text{TSCHP}}$	J117-7	0: HP
	2	primary corona wire cleaner reversal sensor (MS6)	$\overline{\text{PCLRP}}$	J102-B5	0: reversal position

Table 3-519E

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Address	bit	Signal	Notation	Jack No.	Remarks
PA5 (input)	3	transfer/separation corona wire cleaner reversal sensor (MS5)	$\overline{\text{TSCHP}}$	J117-5	0: reversal position
	4	DP busy signal	DPBS	—	
	5	reserved.			
	6	hopper black toner out signal (Q18)	$\overline{\text{BTEP}}$	J111-A10	0: below specified level
	7	power switch OFF command open circuit signal	PWOFF	J111-A7	0: normal
PB5 (output)	0	data output to analog processor PCB	DADATA	J119-53	
	1	clock signal to analog processor PCB	DACLK	J119-52	
	2	LOAD signal to analog processor PCB	DALOAD	J119-54	
	3	communication to image processor PCB	AESEL	J119-72	
	4	communication to image processor PCB	SHSEL	J119-68	
	5	communication to image processor PCB	BDSEL	J119-69	
	6	reserved.			
	7	reserved			
PC5	0	document leading edge signal for No. 1 registration clutch	—	—	
	1	No. 1 registration clutch ON signal (internal)	—	—	0: ON
	2	No. 1 registration clutch OFF signal (internal)	—	—	0: OFF
	3	document leading edge signal for image processor	—	—	
	4	No. 1 registration clutch ON sensor signal (internal)	—	—	
	5	communication to image processor PCB	GRAIPRCFC	J119-59	
	6	reserved.			
	7	reserved.			

Table 3-519F

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Address	bit	Signal	Notation	Jack No.	Remarks
PA6 (input)	0	color toner out signal 1	$\overline{\text{CTEP1}}$	J101-B1	
	1	color toner out signal 2	$\overline{\text{CTEP2}}$	J101-B2	
	2	color toner signal 1	CT1	J101-B5	
	3	color toner signal 2	CT2	J101-B4	
	4	color toner signal 3	CT3	J101-B3	
	5	BD ready signal	BDRDY	J116-64	0: ready
	6	laser scanner motor ready signal	$\overline{\text{LMRDY}}$	J115-10	0: ready
	7	laser power ready signal	LPRDY	J116-7	0: ready
PB6 (output)	0	black developing assembly release solenoid (SL4) drive signal	$\overline{\text{BDRSD}}$	J103-B12	1: SL4 ON
	1	color toner supply solenoid (SL3) drive signal	$\overline{\text{CTSSD}}$	J101-A2	1: SL3 ON
	2	color toner concentration sensor lamp (LA851) ON signal	CTLON	J101-B7	0: lamp ON
	3	reserved.			
	4	CD unit changer manual feed start command	$\overline{\text{MFON}}$	J107-9	1: start
	5	CD unit changer manual feed shutter solenoid (SL905) drive signal	$\overline{\text{MFSSD}}$	J107-8	1: SL905 ON
	6	CD unit changer manual feed skew roller drive solenoid (SL904) drive signal	$\overline{\text{MFRSD}}$	J107-7	1: SL904 ON
	7	CD unit changer reset signal	$\overline{\text{RESET}}$	J107-6	1: reset
PC6 (output)	0	laser scanner motor (ML) drive signal	$\overline{\text{LMD}}$	J115-11	1: motor ON
	1	laser scanner motor high-speed rotation signal	LMH	J115-9	0: high-speed rotation
	2	color developing clutch (CL3) drive signal	$\overline{\text{CDVLD}}$	J101-A4	1: clutch ON
	3	reserved.			
	4	reserved.			
	5	laser intensity adjustment signal	LDATA	J116-1	
	6	data shift clock signal	LPC_CLK	J116-3	
	7	laser intensity adjustment data read signal	LPC_LOAD	J116-5	

Table 3-519G

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Address	bit	Signal	Notation	Jack No.	Remarks
SPA (output)	0	lower feeder No. 1 motor (M5) drive command	LF1A	J109-B6	alternates between '1' and '0' while M5 rotates
	1		LF1B	J109-B9	
	2		$\overline{\text{LF1A}}$	J109-B7	
	3		$\overline{\text{LF1B}}$	J109-B10	
	4	lower feeder No. 2 motor (M6) drive command	LF2A	J118-1	alternates between '1' and '0' while M6 rotates
	5		LF2B	J118-4	
	6		$\overline{\text{LF2A}}$	J118-2	
	7		$\overline{\text{LF2B}}$	J118-5	
SPB (output)	0	delivery feeder motor (M7) drive command	DFA	J110-A6	alternates between '1' and '0' while M7 rotates
	1		DFB	J110-A9	
	2		$\overline{\text{DFA}}$	J110-A7	
	3		$\overline{\text{DFB}}$	J110-A10	
	4	lens motor (M3) drive command	$\overline{\text{LNA}}$	J114-A2	alternates between '1' and '0' while M3 rotates
			LNA	J114-A1	
	5		$\overline{\text{LNB}}$	J114-A5	
			LNB	J114-A3	
	6	horizontal registration motor (M4) drive command	$\overline{\text{CRGA}}$ CRGA	J103-8 J103-7	alternates between '1' and '0' while M4 rotates
	7		$\overline{\text{CRGB}}$ CRGB	J103-11 J103-10	
SPC (input)	0	lens motor (M3) power supply switch signal	LNSTB	J114-A4	1: 5V 0: 24V
	1	horizontal registration motor (M4) power supply switch signal	CRGSTB	J103-A9	1: 5V 0: 24V
	2	delivery motor (M7) FW/RV switch command	DFFW	—	0: clockwise rotation
	3	DP request signal	DPRQ	—	
	4	lower feeder control signal	DFCTL	—	
	5	lower feeder outlet paper sensor (Q14) signal	$\overline{\text{PDP5}}$	J109-A5	0: paper present
	6	lens home position sensor (Q7) signal	LHP	J114-B13	1: at home position
	7	horizontal paper edge sensor (Q6) signal	PDP2	J104-B2	1: paper present

Table 3-519H

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Address	bit	Signal	Notation	Jack No.	Remarks
SPF (input)	0	filter motor (M13) drive command	FMA	J115-4	alternates between '1' and '0' while MB rotates
	1		FMB	J115-7	
	2		$\overline{\text{FMA}}$	J115-5	
	3		$\overline{\text{FMB}}$	J115-8	
	4	reserved.		—	
	5	reserved.		—	
	6	DP busy signal	DPBS		
	7	Filter home position sensor (Q20) signal	FILHP	J115-2	1: at home position
MT6 (input)	0	key read signal	RTN0	—	reads input from switches on control panel
	1		RTN1	—	
	2		RTN2	—	
	3		RTN3	—	
	4	reserved.			
	5	reserved.			
	6	reserved.			
	7	reserved.			
MT7 (input)	0	cassette 1 (machine top) size switch	RTN0	J104-A6	when pressed, '1'
	1		RTN1	J104-A5	
	2		RTN2	J104-A4	
	3		RTN3	J104-A3	
	4	inch configuration connect signal	RTN4	—	depends on combination with SW101 on DC controller PCB
	5	metric configuration connect signal	RTN5	—	
	6	counter non-Japanese configuration connect signal	RTN6	—	
	7	reserved.			
MT8 (input)	0	cassette 2 (machine top) size switch	RTN0	J104-A6	when pressed, '1'
	1		RTN1	J104-A5	
	2		RTN2	J104-A4	
	3		RTN3	J104-A3	
	4	reserved.			
	5	reserved.			
	6	reserved.			
	7	service mode input push switch (SW501)	RTN7	J111-B9	1: SW501 ON

Table 3-519

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Address	bit	Signal	Notation	Jack No.	Remarks
MT9 (input)	0	cassette 3 (cassette feeding unit top) size switch/paper deck pedestal size switch	RTN0	J108-A7	when pressed, '1'; if paper deck pedestal, PTN2 is reserved.
	1		RTN1	J108-A6	
	2		RTN2	J108-A5	
	3		RTN3	J108-A4	
	4	cassette feeding unit/paper deck pedestal connect signal	RTN4	J108-A3	*
	5	reserved.			
	6	reserved.			
	7	reserved.			
MTA (input)	0	cassette 4 (cassette feeding unit bottom) size switch/paper deck pedestal size switch	RTN0	J108-A7	when pressed, '1'.
	1		RTN1	J108-A6	
	2		RTN2	J108-A5	
	3		RTN3	J108-A4	
	4	cassette feeding unit/paper deck pedestal connect signal	RTN4	J108-A3	*
	5	reserved.			
	6	reserved.			
	7	reserved.			
MTB		for factory.			

Table 3-519J

* The cassette feeding unit and the paper deck pedestal are distinguished based on the following combinations:

Address	bit	Cassette feeding unit	Paper deck pedestal
MT9	4	1	0
MTA	4	1	1

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RDF-B1

Address	bit	Signal	Notation	Jack No.	Remarks
DF0 (output)	0	recycle motor (M4) drive command	RMD	J8-6	1: motor ON
	1	document set indicator LED ON command	$\overline{\text{DSD}}$	J8-4	0: LED ON
	2	reserved.			
	3	brake drive command	$\overline{\text{BKD}}$	J6-2	0: brake ON
	4	stop plate solenoid (SL1) drive command	$\overline{\text{STPSLD}}$	J5-4	0: solenoid ON
	5	paper deflector plate solenoid (SL3) drive command	$\overline{\text{DFSLD}}$ FLPSL	J4-2	0: solenoid ON
	6	for microprocessor	—	—	
	7	mixed document size mode switch input	$\overline{\text{DSM}}$	J8-7	0: mode set
DF1 (output)	0	mixed document size mode indicator LED ON command	$\overline{\text{DSMD}}$	J8-8	0: LED ON
	1	belt motor pulse signal	BMPWM		
	2	belt motor rotation direction signal	BMRD	—	1: RV 0: FD
	3	belt motor (M3) drive command	BMON	—	1: ON
	4	feeder motor (M2) drive command	FMD	J11-1	
	5	feeder motor short brake signal	FMON	—	
	6	pick-up motor (M1) drive command	PUMD	J12-1	1: motor ON
	7	paper retainer solenoid (SL2) drive command	$\overline{\text{WSLD}}$	J5-2	0: solenoid ON
DF2 (input)	0	for communication with external devices	DI	—	
	1	for communication with external devices	DO	—	
	2	for microprocessor			
	3	belt motor clock sensor (S10) signal	BMCLK	J9-23	
	4	for microprocessor	—	—	
	5	for microprocessor	—	—	
	6	for microprocessor	—	—	
	7	for microprocessor	—	—	
DF3 (input)	0	reversal sensor (S8) signal	PDP5	J9-17	1: paper present
	1	pick-up roller sensor (S5) signal	$\overline{\text{PUSP}}$	J9-8	1: pick-up roller at home position
	2	pick-up sensor (S7) signal	PDP1	J9-14	1: paper present
	3	delivery sensor (S6) signal	PDP2	J9-11	1: paper present

Table 3-520A

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Address	bit	Signal	Notation	Jack No.	Remarks
DF3 (input)	4	recycle sensor (S11) signal	LDD	J8-2	0: recycle lever on document
	5	LED1 ON signal	LED1	—	
	6	LED2 ON signal	LED2	—	
	7	LED3 ON signal	LED3	—	
DF4 (input)	0	DIP switch setting	DIPSW1	—	
	1	DIP switch setting	DIPSW2	—	
	2	DIP switch setting	DIPSW3	—	
	3	DIP switch setting	DIPSW4	—	
	4	DIP switch setting	DIPSW5	—	
	5	DIP switch setting	DIPSW6	—	
	6	push switch signal	SW1	—	
	7	editor set signal	$\overline{\text{DCNT}}$	J10-3	0: editor set

Table 3-520B

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Stapler Sorter-A1/Sorter-B1

Address	bit	Signal	Notation	Jack No.	Remarks
ST0 (input)	0	reserved.			
	1	stapling home position sensor (PI12)	SPL-HP	J11-3	1: stapling home position
	2	stapler unit swing sensor (MS9) signal	SWG SET	J8-5	1: home position or stapling position
	3	stapler cover open/closed sensor (MS5) signal	SPLOPN	J10-3	1: stapler cover open
	4	guide bar home position sensor (PI7) signal	SGBHP	J12-6	1: at home position
	5	lead cam home position sensor (PI5) signal	LCHP	J14-5	1: at home position
	6	reserved.			
	7	reserved.			
ST1 (output)	0	guide bar swing motor (M3) phase A excitation signal	$\overline{MA}$	J13-3, 5	alternates between '1' and '0' while motor rotates
	1	guide bar swing motor (M3) phase B excitation signal	$\overline{MB}$	J13-4, 6	
	2	guide bar swing motor (M3) drive command	MON	J13-2	1: motor ON
	3	stapler motor (M4) forward rotation signal	$\overline{SPLMFW}$	—	0: forward
	4	stapler motor (M4) reverse rotation signal	$\overline{SPLMRW}$	—	0: reverse
	5	switch-back path solenoid (SL1) drive command	$\overline{PSLD}$	J7-8	0: SL1 ON
	6	paper path switch solenoid (SL2) drive command	PSLD	J7-8	0: SL2 ON
	7	paper retainer solenoid (SL3) drive command	PHSLD	J5-2	0: SL3 ON
ST2 (output)	0	motor switch signal	—	—	
	1	stapling ready indicator ON signal	SPLOK	J8-4	1: LED ON
	2	bin paper sensor LED ON signal	BPD	J12-2	
	3	motor clock signal	—	—	
	4	stapler unit swing motor (M5) drive command	$\overline{SWGMD}$	J9-1	1: M5 ON
	5	feeder motor clock sensor (PI6) signal	FMCLK	J5-4	
	6	reserved.			
	7	feeder motor (M1) brake signal	—	—	1: M1 OFF

Table 3-521A

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Stapler Sorter-A1/Sorter-B1

Address	bit	Signal	Notation	Jack No.	Remarks
ST3 (input)	0	stapling position sensor signal	SPD	J8-8	1: paper present
	1	reserved.			
	2	manual stapling key signal	MNSPL	J8-1	0: switch ON
	3	non-sort paper sensor signal	$\overline{\text{NSPEXT}}$	J7-5	0: paper present
	4	sort paper sensor signal	$\overline{\text{SPEXT}}$	J7-2	0: paper present
	5	bin unit home position sensor signal	BHP	J14-2	1: bin unit at home position
	6	joint sensor signal	$\overline{\text{SOP}}$	J2-2	0: sorter released
	7	reset signal	—	—	
ST4 (input)	0	stapler position set sensor signal	SPL-SET	J10-6	0: stapler position
	1	reserved.			
	2	reserved.			
	3	reserved.			
	4	reserved.			
	5	reserved.			
	6	reserved.			
	7	reserved.			

Table 3-521B

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Auto Stapler Folder-A1/Auto Stapler-A1

Address	bit	Signal	Notation	Jack No.	Remarks
ST0 (output)	0	stapler guide plate drive motor (M7) drive pulse signal	PMA	J7-11	alternates between '1' and '0' while M7 rotates
	1		$\overline{\text{PMA}}$	J7-12	
	2		PMB	J7-13	
	3		$\overline{\text{PMB}}$	J7-14	
	4	staple guide plate drive motor (M7) drive power supply	PMON	J7-9	1: drive power supply ON
	5	No. 2 paper path drive solenoid (SL3) drive command	$\overline{\text{P2SLD}}$	J4-2	0: SL3 ON
	6	paper deflector plate 1 solenoid (SL1) drive command	$\overline{\text{D1SLD}}$	J4-4	0: SL1 ON
	7	paper deflector 2 solenoid (SL2) drive command	$\overline{\text{D2SLD}}$	J4-6	0: SL2 ON
ST1 (output)	0	feeder motor (M1) drive command	FMD	J7-3	1: M1 ON
	1	No. 1 delivery motor (M4) drive command	DM1D	J7-1	1: M4 ON
	2	No. 2 delivery motor (M2) forward rotation signal	$\overline{\text{DM2FW}}$	—	1: M2 forward
	3	No. 2 delivery motor (M2) reverse signal	$\overline{\text{DM2RW}}$	—	1: M2 reverse
	4	stapler motor (M6) forward rotation signal	$\overline{\text{SPLMFW}}$	—	0: M6 forward
	5	stapler motor (M6) reverse rotation signal	$\overline{\text{SPLMRV}}$	—	0: M6 reverse
	6	shift motor (M8) drive command	SFMD	J5-5	1: M8 ON
	7	swing unit drive motor (M5) drive command	SWMD	J7-5	1: M5 ON
ST2 (input)	0	No. 2 delivery motor clock sensor (PI2) signal	DM2CLK	J9-B13	alternates between '1' and '0' while M2 rotates
	1	stack motor clock sensor (PI10) signal	STMCLK	J6-2	alternates between '1' and '0' while M3 rotates
	2	staple guide plate home position sensor (PI1) signal	SGHP	J9-A13	1: home position
	3	No. 1 delivery motor clock sensor (PI6)	DMICLK	J9-B7	alternates between '1' and '0' while M1 rotates
	4	No. 1 paper path sensor (PI9) singnal	$\overline{\text{PP1D}}$	J9-A10	0: paper present
	5	No. 2 paper path sensor (PI8) signal	$\overline{\text{PP2D}}$	J9-B10	0: paper present
	6	swing unit home position sensor (PI7) signal	$\overline{\text{SWHP}}$	J9-A4	0: swing unit at top or bottom

Table 3-522A

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Auto Stapler Folder-A1/Auto Stapler-A1

Address	bit	Signal	Notation	Jack No.	Remarks
ST2	7	sub tray solenoid (SL4) drive command	$\overline{SSLD}$	J5-4	0: SL4 ON
ST3 (input)	0	stack tray upper limit sensor (MS6) signal	$\overline{VLS}$	J4-10	1: stack tray topmost
	1	stack tray lower limit sensor (MS7) signal	$\overline{LLS}$	J4-12	1: stack tray bottommost
	2	stack tray shift width sensor (MS8) signal	$\overline{SFTW}$	J6-10	0: left/right shift end
	3	stack tray left/right position sensor (PI11) signal	$\overline{LPD}$	J6-5	0: stack tray left
	4	DIP switch (SW1-1)	—		for factory.
	5	DIP switch (SW1-2)	—		0: ON
	6	DIP switch (SW1-3)	—		0: ON
	7	manual stapling key (SW10) signal	MNSPL	J9-B4	0: key ON
ST4 (output)	0	folder feeder motor (M1) drive command	$\overline{PFMD}$	J10-6	1: M1 ON
	1	skew correction solenoid (SL8) drive command	$\overline{SRSD}$	J11-8	1: SL8 ON
	2	lock solenoid (SL3) drive command	$\overline{PSD}$	J11-5	1: SL3 ON
	3	B4Z-fold No. 1 solenoid (SL4) drive command	$\overline{ZMSD}$	J11-4	1: SL4 ON
	4	A3Z-fold solenoid (SL5) drive command	$\overline{ZLSD}$	J11-3	1: SL5 ON
	5	B4 1/2-fold solenoid (SL6) drive command	$\overline{HMSD}$	J11-2	1: SL6 ON
	6	middle deflector plate solenoid (SL2) drive signal	$\overline{PMSD}$	J11-6	1: SL2 ON
	7	B4 Z-fold No. 2 solenoid (SL7) drive command	$\overline{ZMSSD}$	J11-1	1: SL7 ON
ST5 (input/ output)	0	paper folder unit connect signal	$\overline{PFSET}$	J10-3	0: paper fold unit present
	1	folded paper sensor (PT3) signal	$\overline{PD}$	J10-3	0: paper present
	2	stapling home position sensor (MS4) signal	SPLHP	J8-3	1: home position
	3	stapler unit connect signal	$\overline{SPLSET}$	J8-1	0: stapler unit present
	4	reserved.			
	5	reserved.			
	6	stack motor (M3) down signal	$\overline{STMDWN}$		1: M3 forward
	7	stack motor (M3) up signal	$\overline{STMUP}$		1: M3 reverse

Table 3-522B

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Auto Stapler Folder-A1/Auto Stapler-A1

Address	bit	Signal	Notation	Jack No.	Remarks
ST6 (input)	0	reserved.			
	1	reserved.			
	2	reserved.			
	3	swing unit open/closed sensor (MS3) signal	SWDWN	J2-4	0: swing unit closed
	4	staple tray paper sensor (PI3) signal	SPD	J9-A16	1: paper present
	5	stack level sensor (PI4) signal	STL	J9-B16	1: paper is on stack tray
	6	stack tray paper sensor (PI12) signal	STD	J6-8	1: paper present
	7	staple sensor (PT1) signal	HKEMP	J8-6	0: staple present
ST7 (input)	0	joint sensor (MS2) signal	$\overline{\text{SOP}}$	J2-2	0: not connected to copier
	1	stapler cover open/closed sensor (MS5) signal	$\overline{\text{SPLOPN}}$	J4-8	0: stapler cover open
	2	paper folder unit power supply sensor signal	PFPW	J10-5	1: power available
	3	lower left door open/closed sensor (MS2) signal	LLOPN	J12-1	0: lower left door open
	4	reserved.			
	5	reserved.			
	6	reserved.			
	7	reserved.			

Table 3-522C

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Sorter-A1

Address	bit	Signal	Notation	Jack No.	Remarks
ST0	0	lead cam position sensor (PI1) signal	LCHP	J4-2	1: lead cam home position
	1	non-sort position sensor (PI2) signal	BNSP	J4-5	1: bin at non-sort position
	2	push switch (SW2)	—	—	0: SW2 ON
	3	push switch (SW3)	—	—	0: SW3 ON
	4	DIP switch (SW1-1)	—	—	0: SW1-1 PN
	5	DIP switch (SW1-2)	—	—	0: SW1-2 ON
	6	joint switch (MS1)	$\overline{SIP}$	J4-7	0: MS1 ON
	7	paper sensor (PI3) signal	$\overline{PDP}$	J5-2	0: paper present
ST1	0	bin motor down signal	BMDWN	—	1: bin DOWN
	1	bin motor up signal	BMUP	—	1: bin UP
	2	paper deflector plate solenoid (SL1)	PDSD	J6-2	1: SL1 ON
	3	reserved.			
	4	LED1 ON signal	—	—	0: LED1 ON
	5	reserved			
	6	reserved.			
	7	reserved.			
ST2	0	for factory.		J2-7	
	1			J2-5	
	2			J2-3	
	3			J2-1	
	4	reserved.			
	5	reserved.			
	6	feeder motor (M2) drive command	PFMD	J5-4	1: M2 ON
	7	IPC error signal			
ST3		address/data bus	—	—	
ST4		address bus	—	—	

Table 3-523

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CD Unit changer

Address	bit	Signal	Notation	Jack No.	Remarks
AC0	0	Horizontal move motor (M902) drive signal	$\overline{HMC}$	J909-5	0: M902 ON
	1	Horizontal move motor (M902) move-out signal	$\overline{HMF0}$	J909-6	0: M902 rotates in move-out direction.
	2	Not used.			
	3	Not used.			
	4	CD unit changer in operation	BUSY	J907-5	
	5	Not used.			
	6	CD unit claw release detection (Q965) signal	FRD	J905-6	1: Released.
	7	CD unit claw release detection (Q966/ Q967) signal	$\overline{CLRD}$	J905-9	0: Both front and rear released.
AC1	0	Manual feed door dection (MS902) signal	MFD0	J903-5	0: Manual feed door open.
	1	CD unit move-out switch (SW902) signal	$\overline{SELECT}$	J906-4	0: SW902 ON
	2	CD unit move-out switch (901) signal	$\overline{EJECT}$	J906-3	0: SW901 ON
	3	For factory adjustmant.		J910-1	
	4			J910-2	
	5			J910-3	
	6			J910-4	
	7			J910-5	
AC2	0	Communication with copier.	TXD	J907-8	
	1		RXD	J907-7	
	2	Manual feed pick-up start signal	$\overline{MFON}$	J907-1	0: Manual feed pickup start.
	3	Horizontal move motor (M902) clock	HMCLK	J909-9	Alternates betweem '1' and '0' while in rotation.
	4	Vertical move motor (M901) down signal	VMDWN	—	1: M901 rotates in ascent direction.
	5	Vertical move motor (M901) up signal	VMUP	—	1: M901 rotates in ascent direction.
	6	Vertical move motor (M901) brake signal	VMBK	—	1: M901 braked.
	7	CD unit release detection (Q968) signal	$\overline{CRD}$	J905-11	0: Released.

Table 3-524A

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CD Unit changer

Address	bit	Signal	Notation	Jack No.	Remarks
AC3	0	CD unit vertical move home position detection (Q963) signal	$\overline{VHP}$	J904-B13	1: At home position
	1	CD unit horizontal move home position detection (Q961) signal	$\overline{HHP}$	J904-B10	0: At home position
	2	CD unit horizonral move detection right (Q962) signal	$\overline{HRP}$	J904-A13	0: CD unit detected.
	3	CD unit horizontal move detection left (Q964) signal	$\overline{HLP}$	J904-A16	0: CD unit detected.
	4	Color toner signal 1	CT1	J908-3	See Table 3-400.
	5	Color toner signal 2	CT2	J908-4	
	6	Color toner signal 3	CT3	J908-5	
	7	CD unit door detection (MS901) signal	—	—	'1' when MS901 OFF, and 24V DC cut.
AC4	0	Vertical motor lock release solenoid (SL 901) drive signal	$\overline{VMLSD}$	J904-A2	0: SL901 ON
	1	CD unit move soleniod (SL 906) drive signal	$\overline{FSD}$	J904-B2	0: SL906 ON
	2	CD unit move-out clutch (SL902) drive signal	$\overline{FOCD}$	J904-B16	0: SL902 ON
	3	CD unit move release soleniod (SL 907) drive signal	$\overline{FRSD}$	J904-A6	0: SL907 ON
	4	CD unit move release soleniod (SL902) drive signal	$\overline{CRSD}$	J904-A4	0: SL902 ON
	5	Manual feed switch solenoid (SL903) drive signal	$\overline{MFSD}$	J904-B4	0: SL903 ON
	6	CD unit move-in clutch (CL901) drive signal	$\overline{FICD}$	J904-A8	0: SL901 ON
	7	Not used.			
AC5	0	CD unit changer control panel LED ON signal	$\overline{LED\text{-}DRV}$	J906-12	0: LED ON
	1		$\overline{LED\text{-}BR}$	J906-11	
	2		$\overline{LED\text{-}G}$	J906-10	
	3		$\overline{LED\text{-}BL}$	J906-9	
	4		$\overline{LED\text{-}R}$	J906-8	
	5		$\overline{LED\text{-}L}$	J906-7	
	6		$\overline{LED\text{-}M}$	J906-6	
	7		$\overline{LED\text{-}U}$	J906-5	

Table 3-524B

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F. Adjustment Mode (✳3✳)

Select the desired screen using the △ and ▽ keys.

- Pressing the density key allows the items to be selected in groups of five.
- Enter the settings using the numeric keypad or the ENLARGE/REDUCE key.
- Reverse the +/– using the ID key.
- Press the OK key to store the settings; the settings must be within the ranges given.

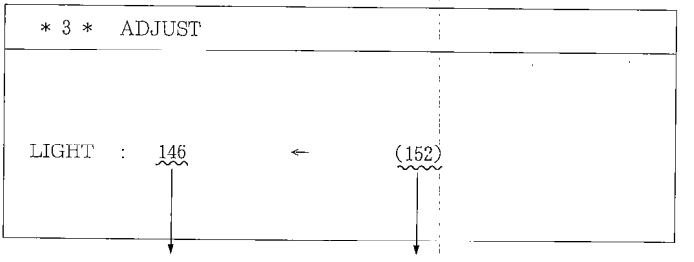

Figure 3-511 ADJUST Screen

Item	Adjustment	Range	Remarks
LIGHT_BK	adjusts light intensity (copy density 5; applies to both manual and AE)	80 to 215	A higher setting lowers the copy density; after the adjustment, be sure to execute 'CCD-LAMP' (✳4✳); unit, 0.14 V.
LIGHT_R	corrects intensity for red erasing	–127 to +127	A higher setting lowers the copy density.
AE_SLOP	AE slope	0 to 255	A higher setting lowers the copy density of newspapers.
REGIST	adjusts leading edge margin (registration roller ON timing)	0 to 255	A higher setting delays the registration roller ON timing, thereby increasing the leading edge margin; unit, 0.48 mm.
LE_BLANK	adjusts leading edge non-image width (laser exposure OFF timing)	1 to 255	A higher setting delays the laser exposure OFF timing, thereby increasing the leading edge non-image width; unit, 0.127 mm.

Table 3-525A

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Item	Adjustment	Range	Remarks
SI_BLANK	adjusts side non-image width (laser ON/OFF timing)	0 to 255	A higher setting decreases the non-image width at the front , thereby increasing the non-image width at the rear; unit, 0.127 mm.
BRAKE_SC	adjusts scanner stop position (scanner brake ON timing)	1 to 50	A higher setting moves the stop position to the left; unit, 2 ms.
GRID_N	adjusts grid bias	0 to 63	A higher setting (closer to 63) increases the bias (closer to –960 V), thereby increasing the copy density.
GRID_P	adjusts grid bias for photo mode		
BIAS_N	adjusts developing bias (DC component) for black copy	0 to 63	A higher setting (closer to 63) increases the bias (closer to –500 V), thereby decreasing the copy density.
BIAS_C	adjusts developing bias (DC component) for color copy		
BIAS_CCD	corrects developing bias (DC component) for formation of latent images y laser	–32 to +32	
BIAS_MKR	corrects developing bias (DC component) for formation of analog latent images with red filter while reading by CCD		
TRAN_1	adjusts transfer current	0 to 63	A higher setting (closer to 63) increases the current.
TRAN_2	adjusts transfer current for 2nd side of overlay/two-sided copy		
TRAN_C	adjusts transfer current difference for color copy		
SEP_1	adjusts separation current	0 to 63	A higher setting (closer to 63) increases the current.
SEP_2	adjusts separation current for 2nd side of overlay/two-sided copy		
CHARACTE	adjusts thickness of characters	0 to 4	A higher setting increases the width of characters in the add-on mode.
RED THICK	adjustment of red recognition level	–8 to +8	Increasing the setting lessens the possibility of erroneous detection of red. However, fine red lines do not reproduce well.

Table 3-525B

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Item	Adjustment	Range	Remarks
SHADE	adjusts the size of shading dots for highlight mode	0 to 4	A higher setting increases the shading dots in the highlight mode.
SCREEN	adjusts the size of shading dots on screen	0 to 4	A higher setting increases the shading dots in the screen mode.
BOOK_ERA	adjusts book frame erasing width	1 to 100	A higher setting increases the erasing width; unit, 1 mm.
AD_P	adjusts position of standard add-on (memo, number, date)	1 to 50	A higher setting moves the output to the center; unit, 1 mm.
AD_A	adjusts frame of standard add-on (memo, number, date)	1 to 50	A higher setting increases the erasing width; unit; 1 mm.
OL2_XM_S	corrects scanner vertical repro ratio for 2nd side of small-size paper overlay/two-sided copy	–127 to +127	A higher setting increases the scanner vertical repro ratio; unit, 0.1 %. (See P. 3-213)
OL2_XM_L	corrects scanner vertical repro ratio for large-size overlay copy	–127 to +127	Smoll size; A4, B5, A3, LTR, STMT Large size; B4, A4-R, B5-R, LTR_R, 11"×17", LEGAL
LSR_ORGN	adjusts laser scanning origin	–127 to +127	for factory.
CCD_ORGN	adjusts CCD read origin	–127 to +127	for factory.
LSR_X_D	corrects laser erase sub scanning (DIRECT)	–8 to +7	A higher setting advances the laser ON timing in sub scanning direction; see P. 3-214.
LSR_Y_D	corrects laser erase main scanning (DIRECT)	–127 to +127	A higher setting advances the laser ON timing in main scanning direction; see P. 3-214.
LSR_YM_D	corrects laser erase main scanning repro ratio (DIRECT)	–127 to +127	A higher setting increases the repro ratio in main scanning direction; see P. 3-214.
LSR_X_R	corrects laser erase sub scanning (REDUCE)	–8 to +7	A higher setting advances the laser ON timing in sub scanning direction; see P. 3-214.
LSR_Y_R	corrects laser erase main scanning direction (REDUCE)	–127 to +127	A higher setting advances the laser ON timing in main scanning direction; see P. 3-214.

Table 3-525C

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Item	Adjustment	Range	Remarks
LSR_YM_R	laser erase main scanning repro ratio (REDUCE)	–127 to +127	A higher setting increases the repro ratio in main scanning direction; see P. 3-214.
LSR_X_E	laser erase sub scanning (ENLARGE)	–8 to +7	A higher setting advances the laser ON timing in sub scanning direction; see P. 3-214.
LSR_Y_E	corrects laser erase main scanning (ENLARGE)	–127 to +127	A higher setting advances the laser ON timing in main scanning direction; see P. 3-214.
LSR_YM_E	corrects laser erase main scanning repro ratio (ENLARGE)	–127 to +127	A higher setting increases the repro ratio in main scanning direction; see P. 3-214.
BIAS_BL	adjusts developing bias (DC component) difference for blue copy	–32 to +32	Sets the difference for each color in relation to BIAS-C (red).
BIAS_GR	adjusts developing bias (DC component) difference for green copy		
BIAS_BR	adjusts the developing bias (DC component) difference for brown copy		
SZ1_ADJ	for factory		
SZ2_ADJ			
SZ3_ADJ			
BK_BELT	for factory only.		
DOC_STOP	adjusts document stop position (for RF)	–7 to +7	A higher setting moves the document to the right; see P. 3-216. (unit: 0.33 mm)
IP_PCB	adjusts at the time of replacing the image processor PBC	0—255	When the image processor PCB and the DC controller PCB are replaced, enter the version number indicated on the image processor PCB.
MKR_TH	red recognition level adjustment in freehand editing mode	0 to 4	Increasing the setting lessens the possibility of erroneous detection of red. However, lighter areas tend to be hard to recognize.

Table 3-525D

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G. Function/Inspection Mode (✳4✳)

- Select the desired screen using the ▽ key and △ key.
- Press the OK key to execute the operation; a second press stops the operation.

The operation under each item must be executed in the standby state only.

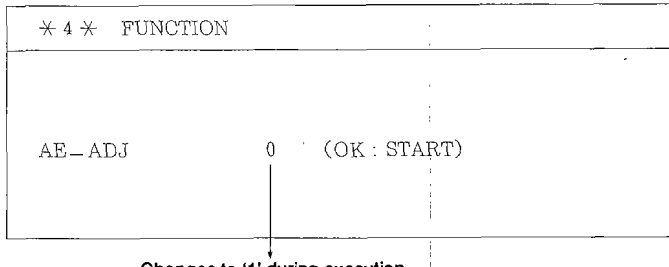

Figure 3-512 FUNCTION Screen

Item	Adjustment	Remarks
DEV_REL	engages black developing assembly/ CD unit	A press on the OK key releases the black developing assembly; thereafter, returns to '0' automatically.
TONER_S	supplies black toner at time of installation	A press on the OK key supplies black toner to the black developing assembly from the hopper (7 min max.); thereafter, stops automatically.
CD_ROT	idle rotation mode for CD unit (at time of installation) 00 ← toner detection CD_ROT: 0 (if '1', toner present)	A press on the OK key causes the main motor to rotate, thereby stirring the developer inside the CD unit; 3 min later, stops automatically. Do NOT execute unless starter has been replaced.
LCD_CHK	missing dot check mode (LCD)	The white and black screens are brought up 1 sec each.
ERROR	clear mode for E000, E001, E002, and E020; clear mode for 'WASTE TONER FULL' message	To clear the error code, press the OK key so that the indication is '1'. The 'WASTE TONER FULL' message will not disappear except by this mode.
SCAN LAMP	checks scanning lamp ON	A press on the OK key causes the scanning lamp to go ON; if the lamp is kept ON for 40 sec or more, the error ON sensor circuit causes the power switch to go OFF.

Table 3-526A

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Item	Adjustment	Remarks
HPPR_MTR	checks hopper motor operation; No. 3 registration roller clutch operation	A press on the OK key causes the main motor, hopper motor, and No. 3 registration roller clutch to go ON. Do not keep it ON too long, or toner may overflow the black developing assembly.
DISP_LED	checks LED ON (control panel)	A press on the OK key causes the LEDs on the control panel to flash; another press causes them to go OFF.
LSR_MRR	checks laser/laser scanner motor operation; use it for BD adjustment	A press on the OK key causes the main motor, laser, and laser scanner motor to go ON. Turn them OFF within 10 sec to protect the photosensitive drum except for BD adjustment; see the P. 4-36.
LASER	adjusts laser power	Adjust the laser warm-up time after replacement of the DC controller PCB or the laser unit. A press on the OK key activates automatic adjustment; see P. 3-215.
CCD_LAMP	adjusts analog processor PCB gain/offset	A press on the OK key activates automatic adjustment. □ ← CCD_LAMP After automatic adjustment, and 'CCD_LAMP'; if '1' through '3' indicated, see the Image Adjustment Basic Procedure.
L_TEST1	outputs test pattern 1	Outputs a character pattern; see the figure 3-513.
L_TEST2	outputs test pattern 2	Outputs a grid pattern; see the figure 3-514.
L_TEST3	black latent image laser erase mode	Set a *black* document on the copyboard; a press on the OK key forms a black latent image on the photosensitive drum, which will be erased by the laser and output as a copy image. Use it to check the discrepancy in analog latent images.
L_TEST4	red latent image laser erase mode	Set a *black/red* document on the copyboard; a press on the OK key forms a black/red latent image on the photosensitive drum, which will be erased by the laser and output as a copy image. Use it to check the discrepancy in analog latent images and the red areas read by the CCD.
ADJ_PRMT_	adjustment mode (*3*) setting output	Use it to obtain hard copy of the settings made in the adjustment mode; see the figure 3-515.

Table 3-526B

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Item	Adjustment	Remarks
IP_CHK	checks operation of image processor PCB	In response to a press on the OK key, the operation of the image processor PCB is checked, and the results are displayed; see p. 3-215. no indication: OK 1: PCB error 2: error in DC controller/IP harness
RAM_INIT	initializes RAM data	A press on the ID key initializes the RAM on the DC controller PCB; execute it only after replacement of the DC controller, and enter the values shown on the label (✳3✳; settings and others) once again and be sure to execute 'CCD-LAMP' (✳4✳) as well.

Table 3-526C

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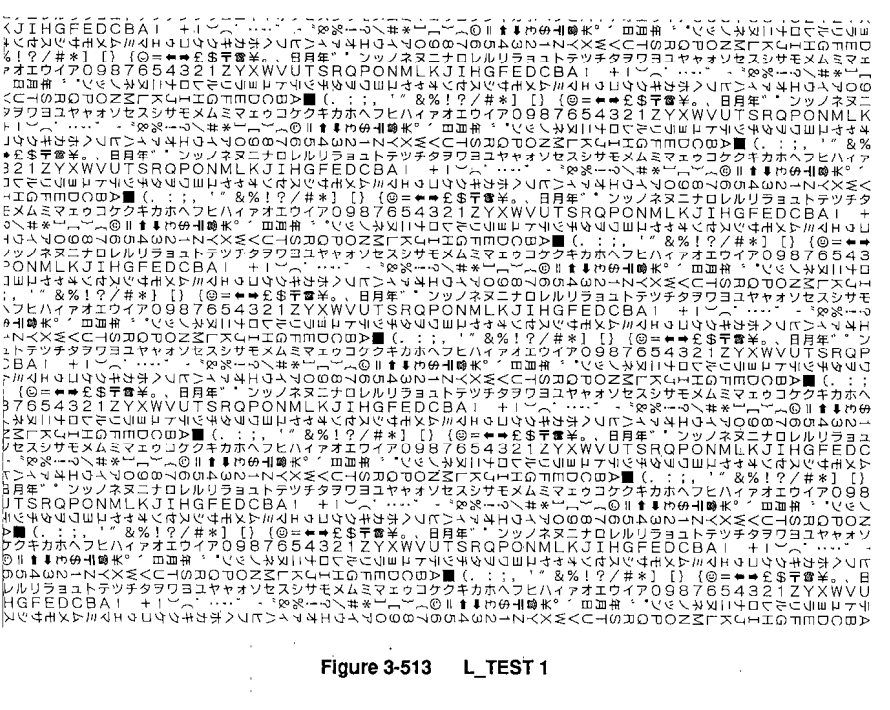

Figure 3-513 L_TEST 1

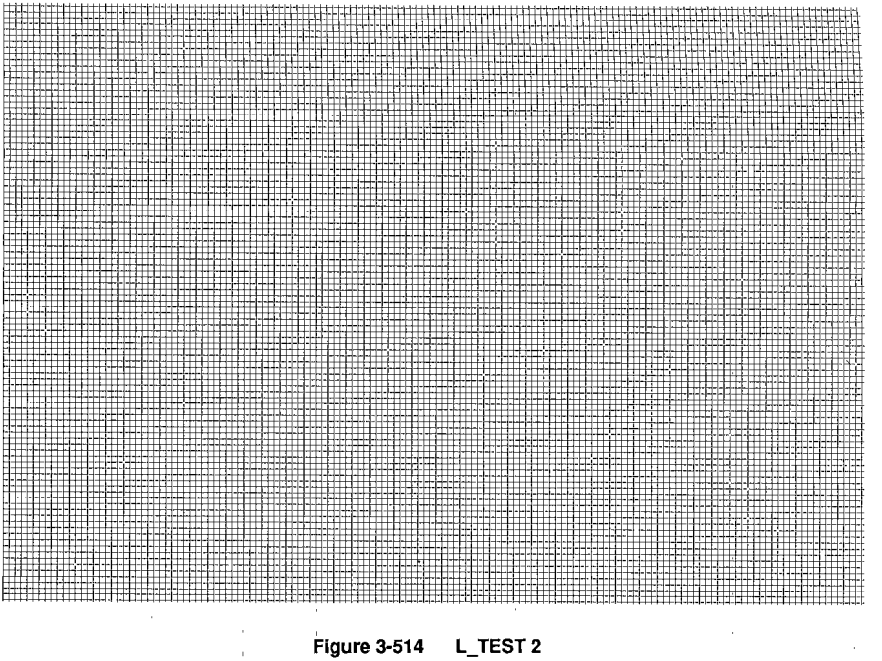

Figure 3-514 L_TEST 2

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```
 -- ADJUST --
LIGHT-BK  180  REDTHICK     0
LIGHT-FA    0  SHADE        3
AE-SLONE   92  SCREEN       1
REGIST    121  BOOK-ERA     10
LE-BLANK   31  AD-P         8
SI-BLANK  140  AD-A         14
BLAKE-SC   20  OL2-XM-S     0
GRID-N     40  OL2-XM-L-    8
GRID-P     28  LSR-ORGN-    36

BIAS-N     24  CCD-ORGN-    62
BIAS-C     25  LSR-X-D -    3
BIASCCD     0  LSR-Y-D -    85
BIASMKR     0  LSR-YM-D     2
TRN-1      35  LSR-X-R      0
TRN-2      30  LSR-Y-R -    127
TRN-C       0  LSR-YM-R     0
SEP-1      19  LSR-X-E      2
SEP-2      18  LSR-Y-E -    127
CHARACTE    2  LSR-YM-E     0
```

Item Value

```
NO/ ID / COUNT
 1/0000/     0
 2/0000/     0
 3/0000/     0
 4/0000/     0
 5/0000/     0
 6/0000/     0
 7/0000/     0
 8/0000/     0
 9/0000/     0
10/0000/     0
11/0000/     0
12/0000/     0
13/0000/     0
14/0000/     0
15/0000/     0
16/0000/     0
17/0000/     0
18/0000/     0
19/0000/     0
20/0000/     0
21/0000/     0
22/0000/     0
23/0000/     0
24/0000/     0
25/0000/     0
```

Figure 3-515 ADJ_PRNT

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H. User Option Mode (✱5✱)

- Select the desired screen using the △ and ▽ keys.
- Change the settings using the numeric keypad.
- Press the OK key to store the settings.

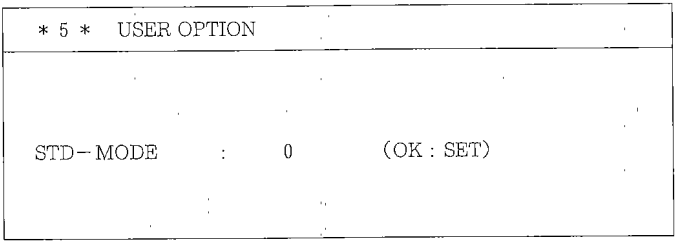

Figure 3-516 USER OPTION Screen

Item	Use	Description	Remarks
STD_MODE	sets the standard mode	allows automatic selection of modes in response to a press on the RESET key.	have the desired mode displayed, select the item, and press the OK key.
AUTO_CAS	enables/disables auto cassette change mechanism	when enabled, the mechanism automatically switches cassettes when the selected cassette runs out of paper during continuous copying; both cassettes must have paper of the same size. 1: disable 0: enable	
1_SORT	selects sort mechanism for 1st document	when enabled, sorting/grouping will be possible even when the document is a single-page document (RDF in use). 0: disable 1: enable	
BIND	selects image shift A or B	when enabled, a binding margin may be created on the 2nd side of the page when in the 'one-sided documents to two-sided copy' or 'two-sided document to one-sided copies' mode. 0 (A): enable 1 (B): disable	

Table 3-527A

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Item	Use	Description	Remarks
MODE_INT	initializes to standard mode	Resets the data stored under 'STD-MODE' and under "USER OPTION' (*5*); after execution, the settings will be those stored at the factory.	Defaults: • DIRECT • auto paper selection • AE • 1 copy
SHUT_OFF	enables/disables auto shut-off mechanism	enables or disables the auto shut-off time (2 hr.). 0: enable 1: disable	
SIZE-DET	enables/disables size identification	enables or disables the document size identification mechanism. 0: enable 1: disable	
C_DENS	selects/de-selects color density adjustment mode	Use it to switch the color density adjustment mode. 0: execute color density mode. 1: execute color density mode at all times.	uopn shipment: 0
DATE_TIM	enables/disables display of date/time	0: enably 1: disable	
DATE_SEL	selects mode of date display	enables selection of any of the following: if April 26, 0: 4/26 1: 26/4 2: APR/26	press '0', '1', or '2'; then, press the OK key.
DENS. IND	switches density indications (9/17)	selects indications by LED between 9 levels and 17 levels. 0: 9 levels 1: 17 levels	
OHP EDGE1	prohibits the horizontal control mechanism for the No.1 registration roller; this is to prevent a jam when OHP is fed from the cassette. (The horizontal registration paper edge sensor does not detect OHP.)	disables horizontal control of the No. 1 registration at time of pick-up (user option). 0: do not prohibit 1: prohibit	may differ between cassette holders; OHP_EDGE1 represents cassette 1.
OHP EDGE2			
OHP EDGE3			
OHP EDGE4			

Table 3-527B

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Item	use	Description	Remarks
TRN_CHG	switches transfer output	switches the output of transfer current; use it when transfer faults occur in a high-temperature/humidity environment. 0: normal 1: increase by 50µA	
WARM_UP	switches wait time (warm-up time)	switches the target fixing temperatures (e.g., to shorten the wait period; Japanese models only). 0: shorter wait time (160°C) 1: longer wait time (190°C)	Do not use the mode; fixing failure may accur when the machine is switched ON in the morning.
WEB	switches cleaning belt drive solenoid (SL2) drive frequency	0: normal 1: twice normal	The cleaning belt drive solenoid, as a rule, is driven depending on the length of paper: if 216 mm or less, once; if 216 mm or more, twice.
US1	stores size of universal cassette	stores the size of the paper used in the universal cassette, thereby enabling the use of the auto reproduction ratio selection mechanism.	LENGTH: paper feed direction WIDTH: front/rear direction
US2			
UL1			
UL2			

Table 3-526C

Position of Cassette Tabs (1: present)

	left		right	
US1	1	0	0	0
US2	1	0	0	1
UL1	1	0	1	0
UL2	0	0	1	0

Note:
Color copier of documents with limited images (e.g., stamps) made in the continuous copying mode tend to be light in density, and the color density adjustment is used to correct such a problem. The problem, however, is more or less absent in a low temperature/humidity environment, and keeping the mode OFF decreases color toner consumption.

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I. Counter Mode (✱6✱)

- Select the desired screen using the △ and ▽ keys.
- A press on the CLEAR/STOP key while holding down the service mode switch (Figure 3-500) clears the respective counter reading.

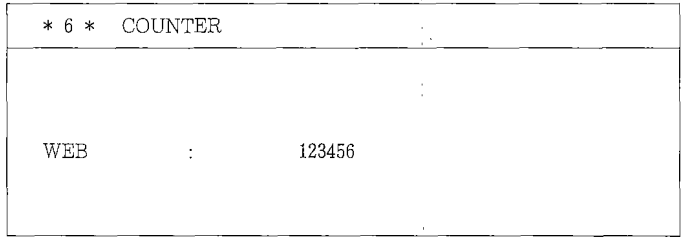

Figure 3-517 COUNTER Screen

Item	Display (max.)	Description
COLOR	color copy total copy counter	999999 (returns to 000000 thereafter)
RED	red copy counter	
BLUE	bule copy counter	
GREEN	green copy counter	
BROWN	brown copy counter	
WEB	number of times cleaning belt drive solenoid has gone ON*	
MANUAL	number of manual feed pick-ups	
CST_1	number of pick-ups from cassette 1	
CST_2	number of pick-ups from cassette 2	
CST_3	number of pick-ups from cassette 3	
CST_4	number of pick-ups from cassette 4	
TWO_SIDE	number of pick-ups from lower feeder assembly (two-sided copy)	
OVERLAY	number of pick-ups from lower feeder assembly (overlay copy)	
DF	number of document pick-ups from RDF	

* At the 300,000th copy, indicates the 'BELT SHORT' message on the display; reset the counter to '000000' to clear the message.

Table 3-527

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J. ADJUSTMENT

1. Adjusting the Vertical Reproduction Ratio Correction Mechanism for the 2nd Copy (overlay)

When an overlay copy is made, the vertical reproduction ratio between the 1st side and the second side of the copy may fail to match.

In particular, the paper may contract after it has gone through the fixing assembly for the 1st side. If such a problem is noted, perform the following to adjust the vertical reproduction ratio.

1) Set the Test Sheet on the copyboard.
2) Select the size to suit the copy paper in question.
   small size: A4/LTR
   large size: B4/11"x17"
3) Select the following in the overlay mode, and make copies:
   1st: black
   2nd: color
4) Select 'OL2_XM_S' (small size) or 'OL2_XM_L' (large size) in the service mode (*3*).
5) Check the copy images; if the vertical reproduction ratio for the color copy is low, increase the setting in the service mode.
6) Press the COPY START key, and check the copies.
7) Press the RESET key to leave the service mode.

Note:
The above adjustment changes the reproduction ratio for the 2nd sides as well.

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2. Adjusting the Laser Erase Correction Mechanism

The copier uses a laser mechanism to execute blank exposure; for this reason, the erasing position wouldl suffer a discrepancy if the optical image formed by the scanning lamp was displaced. In particular, moving the lens tends to bring about minute displacement of the optical images directed to the photosensitive drum, thus displacing the positions for framing and blanking effects. If such a problem is noted, perform the following:

1) Set the Test Sheet on the copyboard; if possible, use the NB-3 Test Sheet (FY9-9025-000).
2) Select 'LSR_X_D' in the service mode.
3) Press the COPY START key.
4) Check the copy image to find out the direction of the discrepancy; use a black dot for reference.

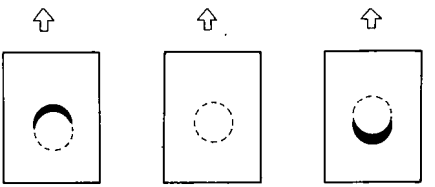

Figure 3-519

5) Adjust the setting in the service mode:
   if A, decrease the setting.
   if B, increase the setting.
6) Press the COYP START key, and check the image; repeat the procedure to make adjustments.
7) Select 'LSR_Y_D' in the service mode (✳3✳).
8) Press the COYP START key.
9) Check the copy image to find out the direction of the discrepancy; use a black dot for reference.

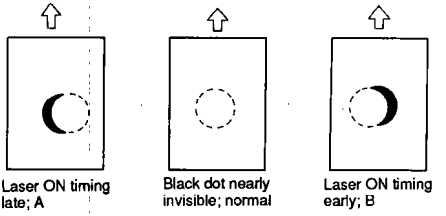

Figure 3-520

10) Adjust the setting in the service mode:
    if A, decrease the setting.
    if B, increase the setting.
11) Press the COPY START key, and check the image; repeat the procedure to make adjustments.
12) Select 'LSR_YM_D in the service mode (✳3✳).
13) Press the COPY START key.
14) Check the copy image, and check the reproduction ratio in the Y direction (laser); use the black dots on both ends.

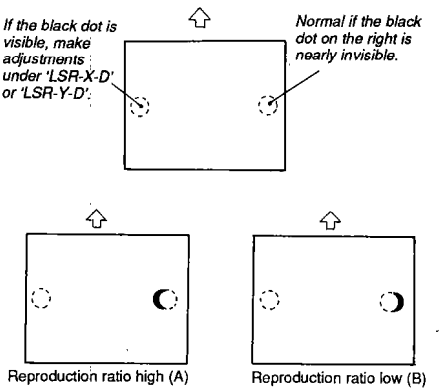
If the black dot is visible, make adjustments under 'LSR-X-D' or 'LSR-Y-D'.
Normal if the black dot on the right is nearly invisible.
Reproduction ratio high (A)
Reproduction ratio low (B)

Figure 3-521

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15) Press the COPY START key, and check the image; repeat the procedure to make adjustments.
16) Repeat steps 2) through 15) to adjust the following:
LSR_X_R
LSR_Y_R
LSR_YM_R
LSR_X_E
LSR_Y_E
LSR_YM_E
17) Press the RESET key to leave the service mode.

Note:
The laser erase correction mode enables adjustment of the following to suit the reproduction ratios:

DIRECT LSR_X_D
LSR_Y_D
LSR_YM_D

REDUCE LSR_X_R
LSR_Y_R
LSR_YM_R

ENLARGE LSR_X_E
LSR_Y_E
LSR_YM_E

3. After Replacing the DC Controller PCB

Perform the follwing if the DC controller PCB has been replaced.
1) Attach the new DC controller PCB.
2) Enter the settings (service mode; ✳3✳) shown on the label attached behind the front door. Remember ro enter the number of the image processor PCB in IP_PCB.
3) Select 'LASER' (service mode; ✳4✳), and press the OK key to adjust the laser warm-up time.
4) Remove the Test Sheet from the copyboard, and set five sheets of A4 paper as if to cover the CCD.
5) Select 'CCD_LAMP' (service mode; ✳4✳), and press the OK key; see the Image Adjustment Basic Procedure.
6) Press the RESET key.
7) Place the Test Sheet on the copyboard.
8) Make a test copy, and check the image.
9) Go though the Image Adjustment Basic Procedure if the image is not satisfactory.

4. Checking the CCD Unit, Analog Processor PCB, and Image Processor PCB

1) Select 'IP_CHK' (service mode; ✳4✳).
2) Press the OK key; the condition of the image processor PCB is displayed.
3) If '1' is displayed, replace the image processor PCB.
If '2' is displayed, check the harness between the image processor PCB and the DC controller PCB.
4) If no indication is made, check the harness between the CCD unit and the analog processor PCB and between the analog processor PCB and the image processor.
■ If the harness is normal.
5) Replace the analog processor PCD and the CCD unit in the order given.

5. When Replacing the Laser Unit

1) Attach the new laser unit.
2) Select 'LASER' (service mode; ✳4✳), and press the OK key to adjust the laser warm-up time automatically.
3) Place the Test Sheet on the copyboard.
4) Select 'L_TEST3' (service mode; ✳4✳), and press the OK key to execute the black latent image laser erase mechanism.
5) Check the image sample; if the erase mechanism is not normal, adjust laser erase correction.

6. After Replacing the Analog Processor PCB, CCD Unit, or Image Processor PCB

Perform the following if the analog processor PCB, CCD unit, or image processor PCB has been replaced:
1) Select 'IP_PCB' in the service mode (✳3✳), and enter the version of the image processor PCB.
2) Set five sheets of A4 paper as if to cover the CCD.
3) Select 'CCD_LAMP' in the service mode (✳4✳), and press the OK key; see the Image Adjustment Basic Procedure.
4) Press the RESET key.
5) Select the automatic color reproduction mode, specifying the black developing assembly.
6) Select 'BIAS_CCD' in the service mode (✳3✳).
7) Place the Test Sheet on the copyboard.
8) Make a test copy; if fogging is noted, make adjustments.
9) Press the RESET key.

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10) Select the framing mode (freehand mode).
11) Select 'BIAS_MKR' in the service mode (✳3✳).
12) Make a test copy; if fogging is noted, make adjustments.
13) Select 'RED THICK' (service mode; ✳3✳), and press the START key to generate a test copy.
14) Check the image of the test copy; if it is not blank, increase the setting.
15) Repeat the above steps until the image on the test copy is blank; note, however, that too high a setting for 'RED THICK' will make colored characters used to form latent image by the laser will thin out.
16) Press the RESET key twice.

7. Adjusting the RDF Document Stop Position

Go through the following steps to adjust the document stop position for the RDF.

1) Enter the copier's service mode; DOC_STOP (✳3✳).
2) Place an A4/LTR document in the document tray.
3) Enter a setting using the numeric keypad or ENALRGE/REDUCE key so that the document stop position is optimum.

Note:
A higher setting moves the document to the right (pick-up direction) between –7 and +7 in 0.33-mm increments.

4) Press the OK key on the control panel; the document will be picked up and sent to the copyboard glass.
5) Open the RDF, check the position of the document, and close the RDF.
6) Press the OK key; the document will be discharged to the document tray.
7) Repeat steps 3) through 6) until the document stop position is correct.
8) Press the RESET key to exit the service mode.

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XI. SELF DIAGNOSIS

The copier is equipped with a self diagnostic mechanism that checks the condition of the machine (sub- systems). The mechanism is initiated by the microprocessor on the DC controller PCB and, if an error is identified, displays a corresponding error code.

<Copier self diagnosis>

Code	Cause	Description
E000	• Thermistor (TH1; contact) • SSR (faulty) • DC controller (faulty)	The output of TH1 does not reach 50°C within 90 sec after the machine has been switched ON; see Notes i. and ii.
E001	• Thermistor (TH1; short circuit) • SSR (faulty) • DC controller PCB (faulty)	The output of TH1 exceeds 223°C; see Notes i. and ii.
E002	• Thermistor (TH1; contact) • Heater (H1; open circuit) • Thermoswitch (TS1; activation) • SSR (faulty) • DC controller (faulty)	The output of TH1 does not reach 190°C within 6 min after it has reached 50°C; see Notes i. and ii.
E003		The output of TH1 drops below 40°C after wait-up; see Notes i. and ii.
E004	• SSR (short circuit; error) • Heater (H1; open circuit) • Thermoswitch (TS1; activation)	• A short circuit is detected in SSR during the heater OFF period immediately after power-on. • A short circuit is detected in SSR during the heater OFF period at 200°C or more.
E010	• Main motor (M1; faulty) • Motor driver PCB (faulty) • DC controller PCB (faulty)	The PLL lock signal is not received for 0.5 sec after the main motor drive signal has been generated.
E020	• Hopper motor (M10; faulty) • Developing assembly toner sensor (Q17; faulty) • Hopper toner sensor (Q18; faulty) • DC controller PCB (faulty)	• The black toner supply signal ($\overline{\text{BTSP}}$) and the black toner out signal ($\overline{\text{BTEP}}$) remain '1' for 3 hr during copying operation (accumulative). • The black toner supply signal ($\overline{\text{BTSP}}$) remains '0' and the black toner out signal ($\overline{\text{BTEP}}$) remains '1' for about 20 sec during copying operation (accumulative).
E030	• Counter (CNT1; open circuit) • DC controller PCB (faulty)	Checks are made immediately before the counter goes ON and OFF: normal if '0' when ON; normal if '1' when OFF.

Table 3-528A

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<Copier self diagnosis>

Code	Cause	Description
E080	• CD unit changer controller PCB (faulty) • DC controller PCB (faulty) • Wiring (faulty) • 5 VDC power supply to CD unit changer controller PCB (faulty)	An error has occurred in the communication between the CD unit changer controller PCB and the DC controller PCB.
E081	• Vertical drive motor (M901) • CD unit changer controller PCB • Vertical motor lock release solenoid (SL901; faulty)	The execution has taken 4 sec or more for a single pulse of the encoder output while the motor is ON.
E082	• Horizontal drive motor (M902) • Motor driver PCB (faulty) • CD unit horizontal home position sensor (Q961; faulty) • CD unit changer controller PCB (faulty) • CD unit (feeding faulty) • CD unit release sensor (Q968; faulty)	• The execution has taken 2 sec or more for a single pulse of the encoder output while the motor is ON. • The CD unit horizontal home position sensor (Q961) does not go ON or OFF within a specific time. • The CD unit does not reach the copier connector within a specific time when it is brought inside the copier.
E083	• CD unit horizontal drive sensor right (Q962; faulty) • CD unit changer controller PCB (faulty)	The sensor goes ON while the compartment is moving vertically.
E084	• CD unit horizontal drive sensor left (Q964; faulty) • CD unit changer controller PCB (faulty)	The sensor goes ON while the compartment is moving vertically.

Table 3-528B

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<Copier self diagnosis>

Code	Cause	Description
E085	• CD unit feeder release sensor (Q965; faulty) • CD unit feeder release solenoid (SL907; faulty) • Gear release spring (faulty)	• The sensor goes ON when the compartment is moving vertically. • The sensor does not detect the gear disengagement after the CD unit has been moved left and right 20 times.
E086	• CD unit claw release sensor (Q966, Q967; faulty) • CD unit claw release solenoid (SL902; faulty)	The sensor does not detect the engagement of the claws after the CD unit has been moved left and right 20 times.
E089	• CD unit changer (faulty operation)	The CD unit changer does not complete operation within 1 min after it has started to operate.
E 100	• Laser unit (faulty) • BD mirror (faulty) • Optical fiber (faulty) • Laser driver PCB (faulty) • Image processor PCB (faulty) • DC controller PCB (faulty)	• The BD signal is not generated within 2 sec after the laser has gone ON. • The frequency of BD signals has suffered a discrepancy.
E 110	• Laser scanner motor (LM; faulty) • Laser scanner driver PCB (faulty) • DC controller PCB (faulty)	• The speed of the laser scanner motor does not reach the specified speed within 2.3 sec after the COPY START key has been pressed. • The motor fails to maintain the specified speed for 2 sec or more after it has reached a specific speed.
E 140	• Laser unit (faulty) • Laser driver PCB (faulty) • DC controller PCB (faulty) • Laser adjustment (Not executed in advance)	The laser power does not reach the specified value within 0.4 sec after the laser has gone ON.

Table 3-528C

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<Copier self diagnosis>

Code	Cause	Description
keys on control panel locked (E202); see Note iii.	• Scanner home position sensor (Q8; faulty) • Scanner motor (M2; faulty) • Motor driver PCB (faulty) • DC controller PCB (faulty)	The scanner does not return to the home position within 5 sec after it has started to move.
E203	• Scanner motor (M2; faulty) • Scanner cable (faulty) • Motor driver PCB (faulty) • DC controller PCB (faulty)	The PLL lock signal is not received from the motor driver for 0.4 sec after the scanner motor drive signal has been generated.
keys on control panel locked (E204); see Note iii.	• Scanner document leading edge sensor (Q9; faulty) • Motor driver PCB (faulty) • DC controller PCB (faulty)	The scanner document leading edge signal is not generated within 0.5 sec after the scanner has started forward.
E210	• Lens home position sensor (Q7; faulty) • Lens motor (M3; faulty) • Lens cable (faulty) • DC controller PCB (faulty)	• The lens home position signal (LHP) is not generated within a specific period of time after the machine has been switched ON. • The lens home position signal (LHP) remains ON more than a specific period of time.
E223	• Filter drive motor (faulty) • Filter home position sensor (faulty) • DC controller PCB	• The filter home position signal (FILHP) is not generated within a specific time when the filter returns to the home position. • The filter home position signal (FILHP) is generated for more than a specific time when the filter moves from the home position.
E240	• DC controller PCB (faulty)	An error has occurred in the communication between the main CPU (Q197) and the sub CPU (Q172).
E660	• IC card unit (faulty) • IC card (faulty)	The input signal is not received within a specific time after the output signal is sent to the IC card unit.
E710	• DC controller PCB (faulty)	The IPU (Q169) cannot be initialized when the power switch is turned ON.

Table 3-528D

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<Copier self diagnosis>

Code	Cause	Description
E711	• DC controller PCB	An IPU communication error has been detected twice or more within 1 sec.
E714	• DC controller PCB (faulty) • IC card unit harness (faulty)	The communication error with the IC card unit cannot be cleared.
E800	• Power-off circuit (SW1 relay drive circuit; faulty)	An open circuit is detected.

Table 3-528E

Note:

i. When an error has occurred, the copier may be reset by switching it OFF once and then ON; this, however, does not apply to E000, E0001, E002, E003, or E020.
To reset the copier, execute 'ERROR' in the service mode (✱ 4 ✱), and press the OK key; this consideration is made to prevent the user from carelessly resetting the machine without realizing possible faults in the thermistor, causing the fixing rollers to overheat and become damaged.

ii. E000, E001, E002, E003, E004, and E020 are displayed upon detection of respective errors without delay; the machine is shut off about 20 sec later.

iii. E202 and E204 can be checked under 'ERR' in the service mode (✱ 1 ✱).

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<RDF>

Code	Cause	Description
E401	• Pick-up motor (faulty)	The shaft of the pick-up motor (M1) is equipped with a flag which blocks the pick-up roller sensor (S5); S5 does not go ON/OFF twice or more within 1 sec.
E402	• Belt motor (faulty)	The number of belt clock pulses for 200 ms is below the specified value.
E403	• Feeder motor (faulty)	The number of belt clock pulses for 200 ms is below the specified value.
E411	• Document sensor faulty	The output of the sensor is 2.3V or more in the absence of paper.
E712	• DC controller PCB (faulty) • DF controller PCB (faulty) • DF cable (faulty)	The communication error with the RDF cannot be cleared.

Table 3-529

Note
When the machine is switched OFF and then ON in response to an error in the 400's, self diagnosis will be executed once again, and the message 'FEEDER FAULT' will be indicated; copies may still be made using the feeder as the copyboard cover.

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<Sorter/Stapler and Sorter/Stapler Folder>

Code	Description		
	Stapler Sorter/Sorter-B1	Stapler folder	Sorter-A1
E500	An error has occurred in the communication with the copier.	An error has occurred in the communication with the copier.	Communication error between the sorter and copier.
E510	The clock signal from the feed motor is not received for 250 ms or more.	The clock signal is not received for 500 ms or more while the feeder motor drive signal is generated.	—
E512	—	The clock signal is not received for 500 ms or more while the No. 1 delivery motor drive signal is generated.	—
E514	—	The clock signal is not received for 500 ms or more while the No. 2 delivery motor drive signal is generated.	—
E520	—	• The upper limit sensor (MS6) does not go ON within 8 sec after the stack motor drive signal has been generated. • The clock signal is not received for 500 ms or more while the stack motor drive signal is generated.	—
E530	The home position sensor (P17) does not go OFF after the guide bar swing motor drive signal has been generated for 2560 pulses.	The stapler guide plate home position sensor (PI1) does not go OFF within 4 sec after the staple guide plate drive motor drive signal has been generated.	—

Table 3-530A

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Code	Description		
	Stapler Sorter/Sorter-B1	Stapler folder	Sorter-A1
E531	• The sapler unit swing sensor (MS9) does not go ON within 500 ms after the Stapler unit swing motor drive signal has been generated. • The sensor does not go OFF within 1000 ms after it has gone ON.	• The stapling home position sensor (MS4) does not go OFF within 300 ms after the staple motor drive signal has been generated. • The sensor does not go ON within 800 ms after the reversal signal has been generated in response to a staple jam.	—
E535	—	• The swing unit home position sensor (PI7) does not go OFF within 300 ms after the swing unit drive motor drive signal has been generated. • The sensor does not go ON within 1 sec after it has gone OFF.	—
E540	• The lead cam home position sensor (PI2) does not go OFF within 2000 ms after the bin shift motor drive signal has been generated. • The sensor does not go ON within 2000 ms after it has gone OFF.	• The stack tray shift width sensor (MS8) does not go OFF within 500 ms after the shift motor drive signal has been generated. • The sensor does not go ON within 1 sec after it has gone ON.	The lead cam home position sensor does not go OFF within 0.5 second after the bin motor drive signal has been output.
E541	—	—	The lead cam home position sensor does not go ON with 1.0 second after the lead cam position sensor has gone OFF.

Table 3-530B

Note:
When the machine is switched OFF and then ON in response to an error in the 500's except 'E500', self diagnosis will be executed once again, and the message 'SORTER AT FAULT' will be indicated; copies may still be made by detaching the sorter (sliding it to the left while holding the grip.

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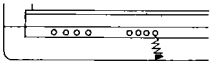
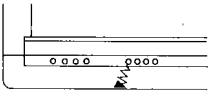
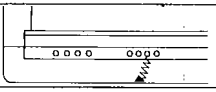
<Image Editing Unit>

The editor is equipped with a self diagnostic mechanism that, upon detection of an error, flashes LEDs to indicate the type of the error.

	Pattern	Cause	Description
1		• Harness (open circuit, disconnection) • Editor controller (faulty)	upon power-on
2		• Cable (between plane-shaped resistor and editor controller; open circuit, disconnection)	at power-on
3		• Plain-shaped resistor (short circuit; more than specific pressure is imposed on editor input face at time of power-on)	at power-on
4		• Data communication (error)	at all time; communication absent 200 ms or more

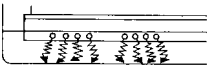



Table 3-531

The LEDs are flashed ON and OFF at intervals of 1 sec.
The machine may be reset by turning it OFF and then ON if for patterns 1 and 4.
The machine will be reset upon removal of the cause if for patterns 2 and 3.

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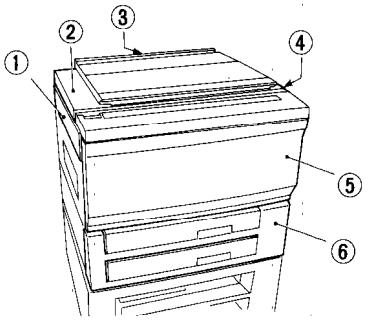
I. EXTERNALS

A. External Covers



① Left cover (7)
② Upper cover (3)
③ Rear cover (8)
④ Right cover (7)
⑤ Front door
⑥ Lower front cover (3)

Figure 4-100

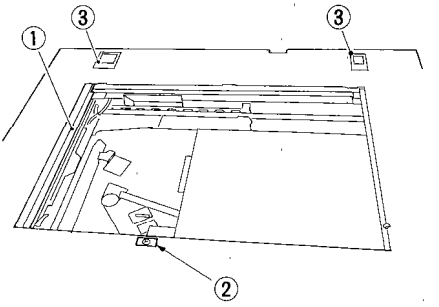
Note:
The number in parentheses indicates the number of mounting screws used.

Detach the covers as necessary for cleaning, inspecting, or repairing the inside of the machine.

Covers that can be detached by mere removal of the screws are left out of the procedure.

1. Upper Cover

1) Detach the copyboard cover.
2) Detach the control panel; see p. 4-3.
3) Detach the rear cover.
4) Remove the two mounting screws, and detach the copyboard glass retainer (right).
5) Detach the copyboard glass.
6) Detach the white plate.
7) Remove the mounting screw, and detach the magnet plate.
8) Pick the bushing (left, right), and push it up to detach.

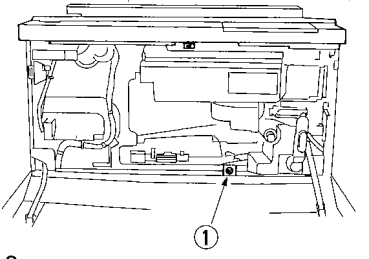


① White plate
② Magnet plate
③ Bushing

Figure 4-101

2. Left Cover

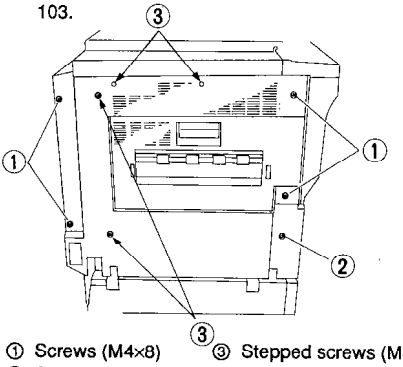
1) Slide out the cassette from the copier.
2) Open the front door, and remove the screw that holds the lower front cover.



① Screw

Figure 4-102

3) Detach the copyboard.
4) Remove the seven screws shown in Figure 4-103.



① Screws (M4×8)
② Screws (M4×10)
③ Stepped screws (M4)

Figure 4-103

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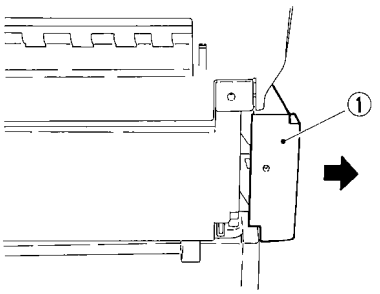
5) Pull the lower front cover to the front.



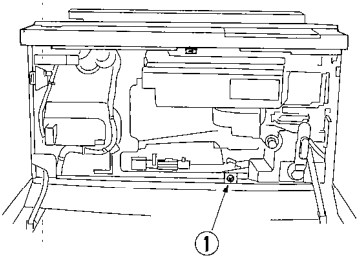
① Lower front cover

Figure 4-104

6) Open the front cover and the delivery assembly; then, detach the left cover.

3. Right Cover

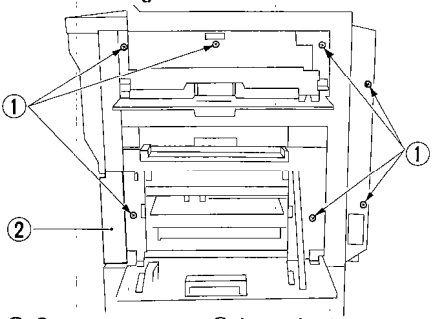
1) Slide out the cassette from the copier.
2) Open the front door, and remove the screw that holds the lower front cover.



① Screw

Figure 4-105

3) Open the CD unit door, and detach the CD unit.
4) Open the right door.
5) Remove the six screws shown in Figure 4-106.
6) Pull the lower front cover to the front; then, detach the right cover.



① Screws ② Lower front cover

Figure 4-106

Note:
Detaching the right cover exposes the durm unit outside light. Protect the unit against light immediately upon detachment.

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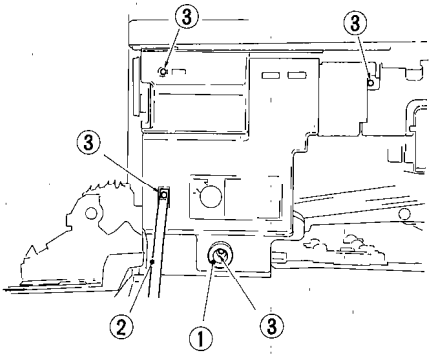
4. Detaching the Inside Left Cover

1) Open the front door and the delivery assembly.
2) Open the hopper.
3) Remove the screw, and detach the fixing assembly knob.
4) Remove the screw, and detach the door tape from the front door.
5) Remove the four screws, and detach the inside left cover.



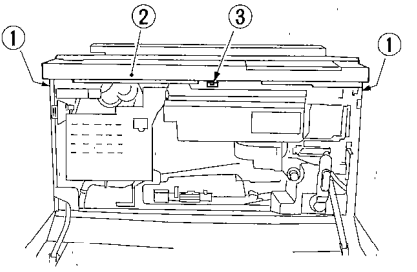
① Fixing assembly knob ③ Screws
② Door tape

Figure 4-107

B. Control Panel

1. Detaching the Control Panel

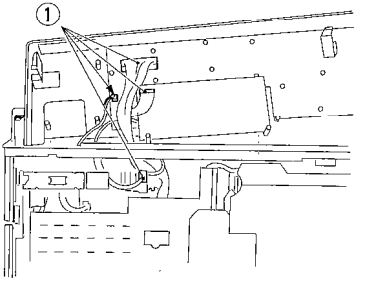
1) Open the front door.
2) Remove the four screws, and detach the inside left cover.
3) Remove the two screws; while disengaging the hook at the center, lift the control panel to the front to detach.



① Screws ③ Hook
② Control panel

Figure 4-108

4) Disconnect the four connectors, and detach the control panel.



① Connectors

Figure 4-109

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C. Copyboard Cover Assembly

1. Replacing the Copyboard Sheet

The copyboard sheet is attached to the copyboard retaining plate using adhesive tape (two-sided); pick its corner and simply peel it off.

After attaching the sheet, press down on its entire area to ensure good adhesion.

D. Fans

1. Outline

The machine is equipped with four fan motors to prevent over heating by circulating the air inside the machine.

Each of these fans serves the following function:

scanner cooling fan (FM1):	cools the scanner.
heat exhaust fan (FM2):	discharges heat from the fixing assembly.
feeder fan (FM3):	retains the copy paper on the feeder bed.
power supply cooling fan (FM4):	cools the DC power supply PCB.

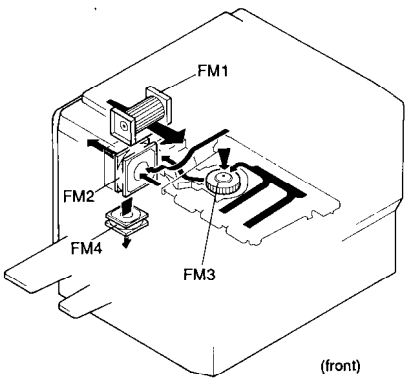
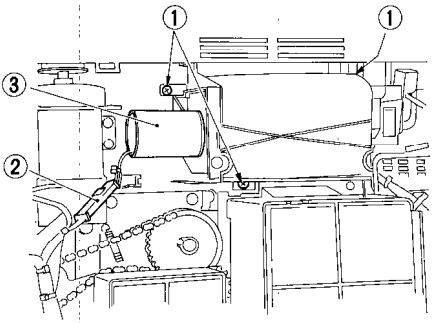


Figure 4-110

2. Detaching the Scanner Cooling Fan (FM1)

1) Detach the rear cover.
2) Remove the three screws, and disconnect the connector; then, detach the scanner cooling fan.

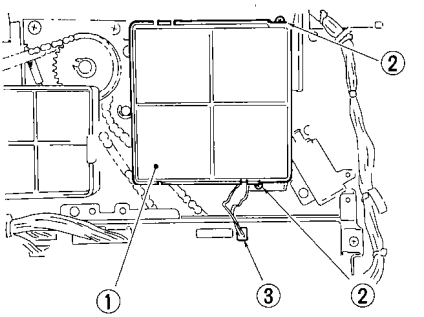


① Screws
② Connector
③ Scanner cooling fan

Figure 4-111

3. Detaching the Heat Exhaust Fan (FM2) Unit

1) Detach the rear cover.
2) Remove the two screws, and disconnect the connector (J120); then, detach the heat exhaust fan unit.



① Ozone filter
② Screw
③ Connector

Figure 4-112

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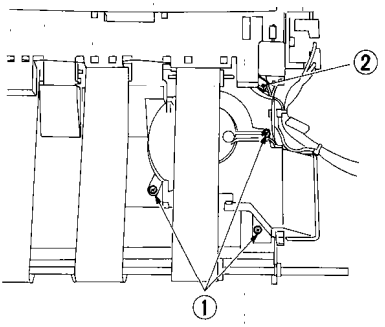
4. Detaching the Feeder Fan (FM3)

1) Detach the feeder assembly; see p. 4-21.
2) Turn over the feeder assembly.
3) Remove the three screws, and disconnect the connector; then, detach the feeder fan.

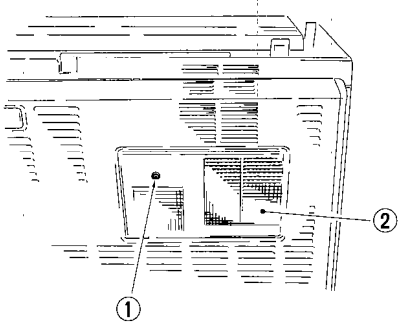


① Screws ② Connector

Figure 4-113

5. Detaching the Ozone Filter

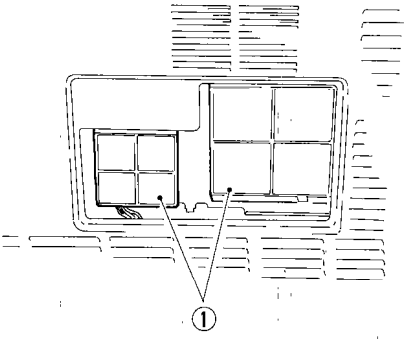
1) Remove the screw, and detach the blanking plate.



① Screw ② Blanking plate

Figure 4-114

2) Detach the ozone filter.



① Ozone filters

Figure 4-115

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II. DRIVE SYSTEM

A. Lens Drive Assembly

1. Outline

The lens drive assembly moves the zoom lens using the rotation of the lens motor (M3) and the lens drive cable.

2. Disassembly and Assembly

Note:
The lens unit is adjusted at the factory using special tools and with high precision. Do not detach parts that are not listed in the Parts Catalog.

a. Routing the Lens Drive Cable

1) Route the lens drive wire as shown in Figure 4-200; i.e., in the order given.

Note:
Wind the cable four times around pulley ③, then route the cable to pulley ④. Wind the cable on pulley ③ clockwise, so that the cable will be at the top of pulley ③.

3. Lubrication

Apply lubricant (CK-0451) evenly along the lens rail.

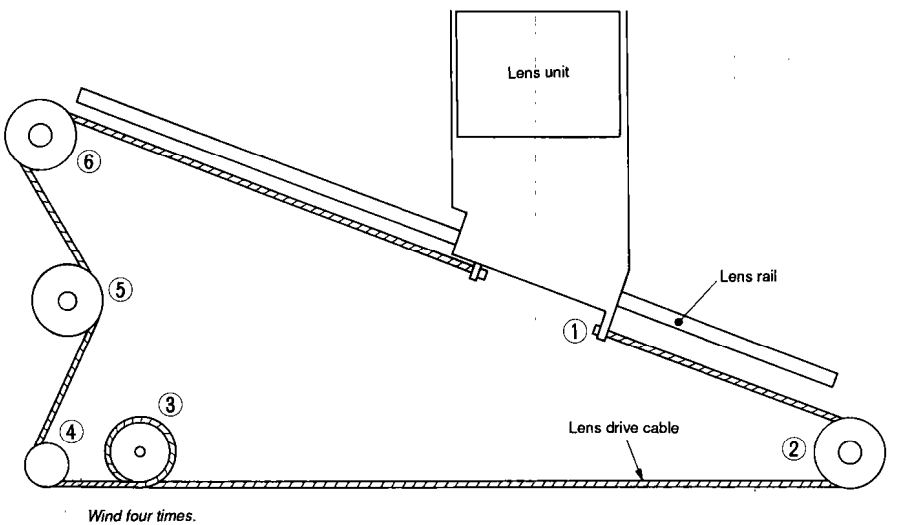

Figure 4-200

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B. Scanner Drive Assembly

1. Routing the Scanner Cable

1) Loosen the two fixing screws shown in Figure 4-201.
2) Turn the adjusting screw to move the pulley ⑥ to the right.
3) Move the No. 1 mirror mount and the No. 2 mirror mount all the way to the front.
4) Route the cable as shown in Figure 4-201; i.e., in the order given.
   - at ②, at the top of the pulley.
   - at ⑤, from bottom to top clockwise; four times.
   - at ③, ④, ⑥ and ⑦, at the bottom of the pulley.
5) Adjust the tension of the cable.
6) Adjust the position of the mirror.

2. Adjusting the Tension of the Scanner Cable

To adjust the tension of the scanner cable, loosen the fixing screw and turn the adjusting screw to adjust the position of the pulley ⑥.

Move the No. 1 mirror mount toward the home position, and measure the tension between ① and ② of the mirror drive cable shown in Figure 4-201 using a spring gauge; make adjustments so that the reading of the spring gauge is 300 to 400 g when the cable is pulled 10 mm to the front.

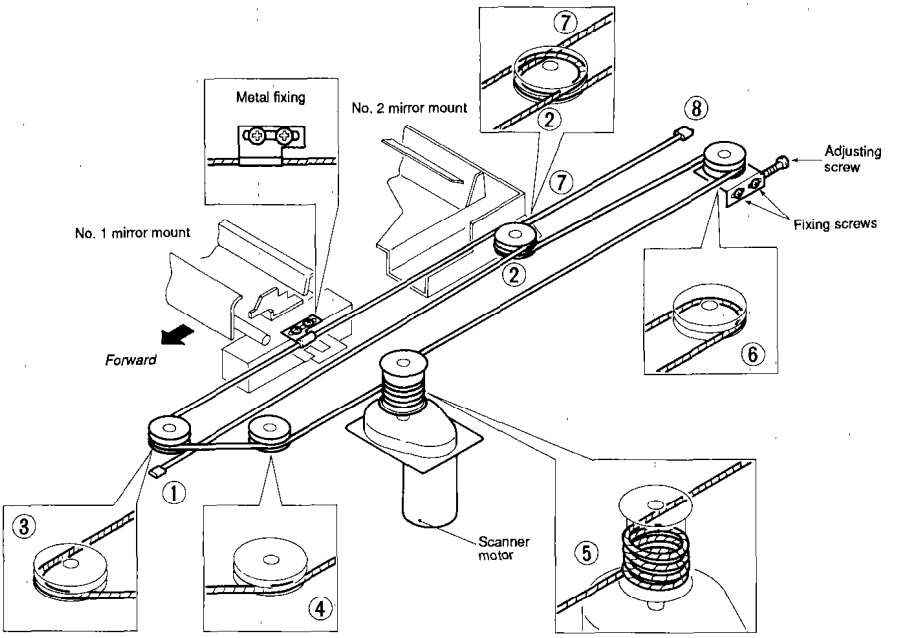

Figure 4-201

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3. Adjusting the Position of the Mirrors (optical length between No. 1 and No. 2 mirrors)

Adjust the position of the mirror after routing the scanner cable.

To adjust the position, reposition the metal fixing of the No. 1 mirror mount.

The cable tends to stretch as copies are made, requiring adjustment.

1) Draw lines 1 cm from both sides of a sheet of copy paper (A4/LTR or A3/11"x17").

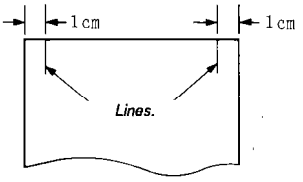

Figure 4-202

2) Place the sheet on the copyboard, and make a copy; call the copy *sheet* A.
3) Place a blank sheet of paper on the copyboard, and feed the original sheet in the manual mode; thererafter call the sheet (original sheet) *sheet* B.

■ When the original sheet has gone through the machine, it is contracted by heat.

4) Put sheet A and sheet B together, and reposition the No. 1 mirror mount so that distances x and y (Figure 4-203) will be identical.

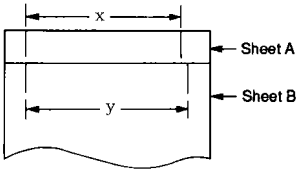

Figure 4-203

x=y: correct
x>y: move the No. 1 mirror mount in the direction of a.
x<y: move the No. 1 mirror mount in the direction of b.

If the distance between the No. 1 mirror and the No. 2 mirror is short, the copy image will be enlarged; if long, reduced.

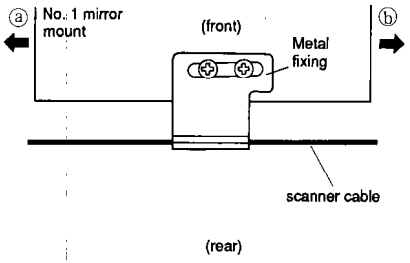

Figure 4-204 (top view)

4. Lubrication

Clean the scanner rail, and apply lubricant (CK-0451) evenly along it.

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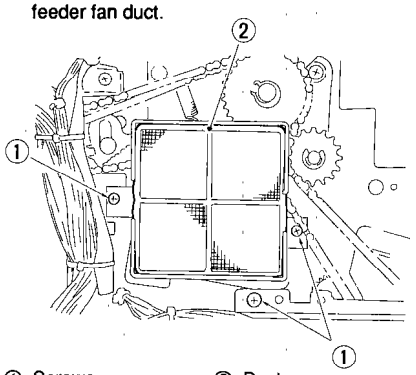
C. Main Motor Assembly

1. Detaching the main motor assembly.

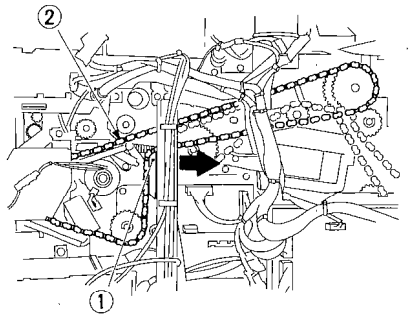
1) Remove the eight screws, and detach the rear cover.
2) Remove the two screws, and disconnect the connector; then, detach the heat exhaust fan unit.
3) Remove the three screws, and detach the feeder fan duct.



① Screws ② Duct

Figure 4-205

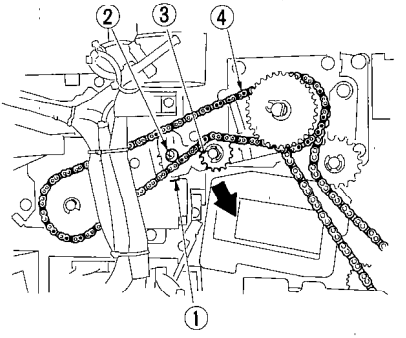
4) Push sprocket A into the direction of the arrow, and detach the pick-up chain from the sprocket of the main motor assembly.



① Sprocket A ② Pick-up chain

Figure 4-206

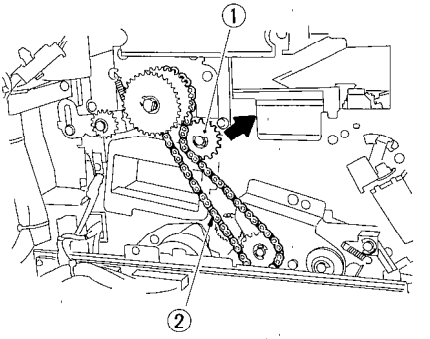
5) Mark the position of the sprocket support plate using a scriber, and remove screw B.
6) Push sprocket B into the direction of the arrow, and detach the drive chain from the sprocket of the main motor assembly.



① Mark ③ Sprocket B
② Screw B ④ Drum drive chain

Figure 4-207

7) Push sprocket C into the direction of the arrow, and detach the fixing assembly drive chain from the sprocket of the main motor assembly.



① Sprocket C ② Fixing assembly drive chain

Figure 4-208

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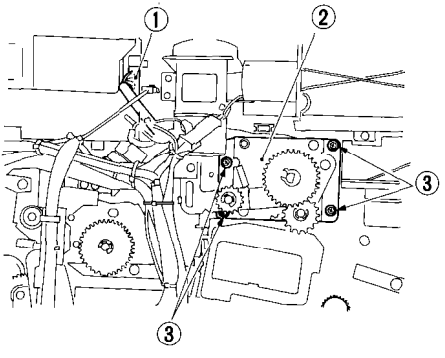
8) Disconnect the connector, and remove four screws; then, detach the main motor assembly.



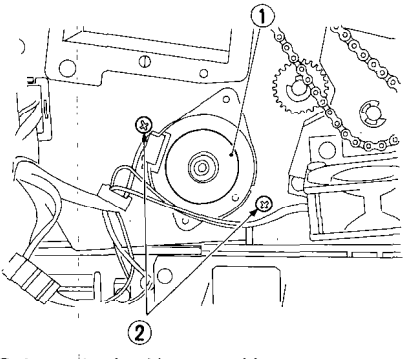
① Connector (J814) ③ Screws
② Main motor assembly

Figure 4-209

D. Lower Feeder Drive Assembly

1. Detaching the Lower Feeder Drive Assembly

1) Detach the rear cover.
2) Disconnect the connectors, and remove the two screws; then, detach the DC controller together with its mount.
3) Remove the two screws, and detach the lower feeder drive assembly.



① Lower feeder drive assembly
② Screws

Figure 4-210

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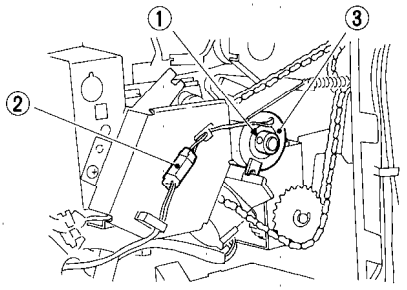
E. No. 1 Registration Roller Drive Assembly

1. Detaching the No. 1 Registration Roller Clutch, Registration Drive Assembly, and Horizontal Registration Drive Assembly

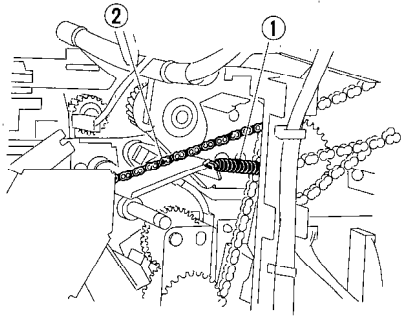
1) Detach the rear cover.
2) Loosen the set screw, and disconnect J30 (2-pin); then, detach the No. 1 registration roller clutch (CL1).



① Set screw
② Connector
③ No. 1 registration roller clutch

Figure 4-211

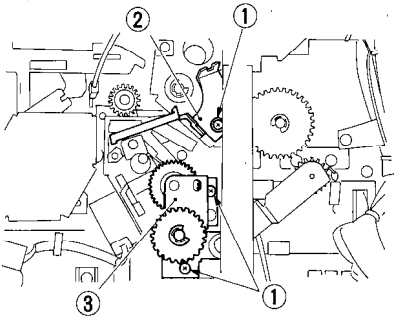
3) Detach the spring, and detach the chain from the sprocket.



① Spring
② Chain

Figure 4-212

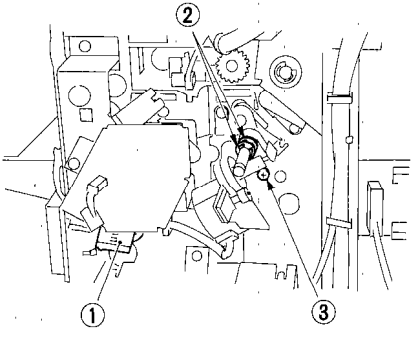
4) Remove the screw, and detach the chain guide.
5) Remove the two screws, and detach the registration drive assembly.



① Screws
② Chain guide
③ Registration drive assembly

Figure 4-213

6) Disconnect J51 (6-pin), and remove the two E-rings and screw; then, detach the horizontal registration drive assembly.



① Connector (J51)
② E-rings
③ Screw

Figure 4-214

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Note:
Insert section A (Figure 4-215) of the horizontal drive assembly into the rear of the bushing, and screw it in place.

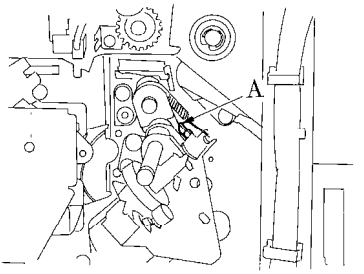
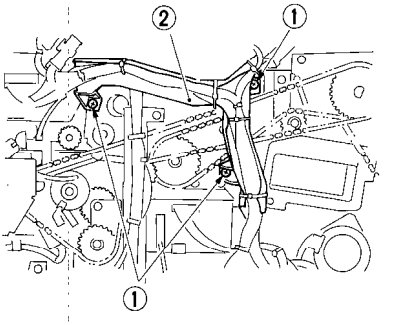


Figure 4-215

2. Detaching the Drum Drive Unit

1) Open the CD unit door, and detach the CD unit.
2) Open the front door.
3) Detach the drum unit; see p. 4-41.
4) Detach the drum separation claw unit.
5) Detach the rear cover and the right cover.
6) Detach the heat exhaust fan (FM2) and the feeder fan duct; see p. 4-4.
7) Detach the DC controller together with its mount.
8) Remove the three screws, and detach the connector assembly for the RDF.
9) Disconnect the two connectors (J812, J811) on the motor driver PCB and the following five connectors.
   - RDF (2 connectors; 4-pin)
   - primary corona cleaning motor (1 connector; 6-pin)
   - pre-exposure lamp (1 connector; 2-pin)
   - scanner cooling fan (1 connector; 2-pin)

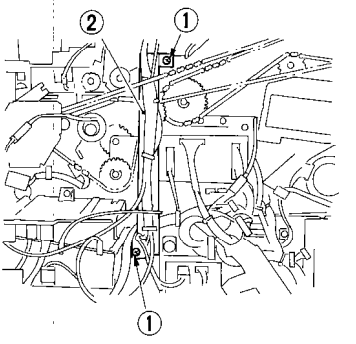
10) Remove the three screws, and detach the cable guide (white).



① Screws ② Cable guide

Figure 4-216

11) Remove the two screws, and detach the cable guide (black).



① Screws ② Cable guide

Figure 4-217

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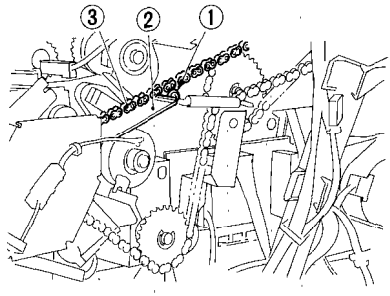
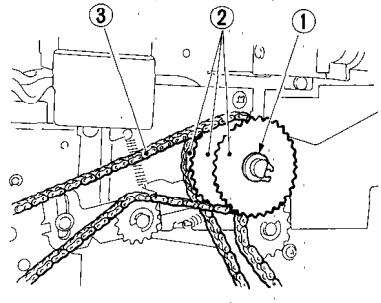
12) Detach the pick-up drive chain and the chain guide.



① Screw
② Chain guide
③ Pick-up drive chain

Figure 4-218

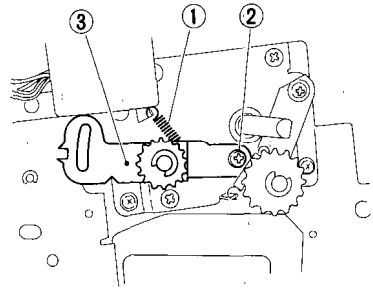
13) Remove the grip ring, and detach the three main motor gears and the chain.



① Grip ring
② Gears
③ Chain

Figure 4-219

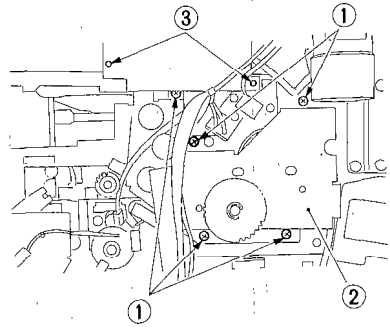
14) Remove the spring and the stepped screw, and detach the tension plate of the drum drive chain.



① Spring
② Stepped screw
③ Tension plate

Figure 4-220

15) Remove the two PCB supports from below the motor driver PCB.
16) Remove the five screws, and detach the drum drive unit.



① Screws
② Drum drive unit
③ PCB support

Figure 4-221

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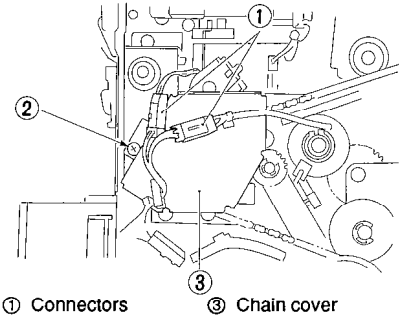
F. Developing Assembly Lock Clutch Assembly

1. Detaching the Developing Assembly Lock Clutch Assembly

1) Detach the CD unit.
2) Detach the black developing assembly and the drum unit.
3) Detach the rear cover and the right cover.
4) Disconnect the two connectors.
5) Remove the screw, and detach the pick-up drive chain cover.

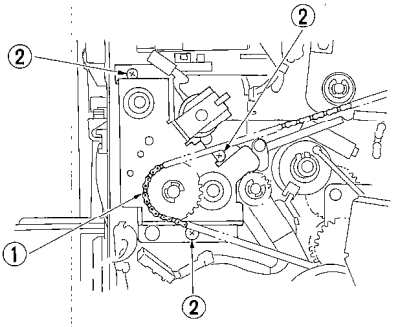


① Connectors ③ Chain cover
② Screw

Figure 4-222

6) Detach the pick-up drive chain.
7) Remove the thee screws, and detach the developing assembly lock/pick-up drive assembly.

Note:
i. Take care not to drop the pin found in the drive shaft.
ii. Do not pull the pick-up output gear with force; filt it so that it disengages from the idler gear.



① Chain ② Screws

Figure 4-223

8) Loosen the set screw, and slide out the developing assembly spring clutch assembly.

Note:
To attach the spring clutch, insert a shim gauge (0.15 to 0.20 mm) into the gap shown in Figure 4-224; then, tighten the set screw.

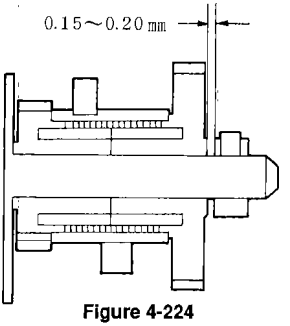


Figure 4-224

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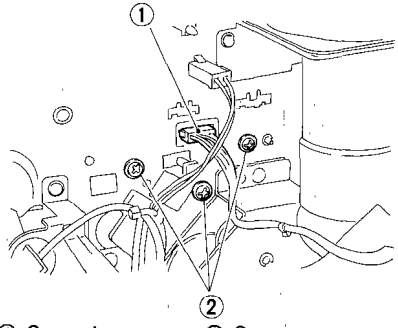
G. Primary Corona Wire Cleaning Motor

1. Detaching the Primary Corona Wire Cleaning Motor Unit

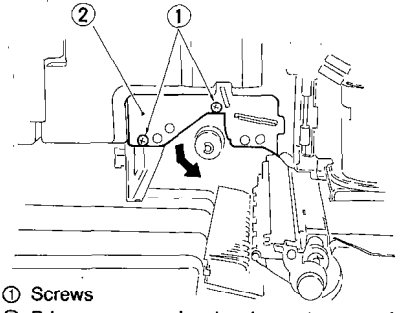
1) Detach the CD unit.
2) Enter the service mode (*4*), and release the black developing assembly using 'DEV_REL'.
3) Detach black developing assembly.
4) Detach the pre-transfer corona assembly.
5) Detach the drum unit.
6) Detach the drum separation claw unit.
7) Detach the rear cover.
8) Detach the motor driver PCB.
9) Detach the pre-exposure lamp assembly; see p. 4-33.
10) Disconnect the connector and remove the three screws from the primary corona wire cleaning motor assembly.



① Connector ② Screws

Figure 4-225

11) Remove the two screws, and detach the primary corona wire cleaning motor assembly by lowering it to the front.



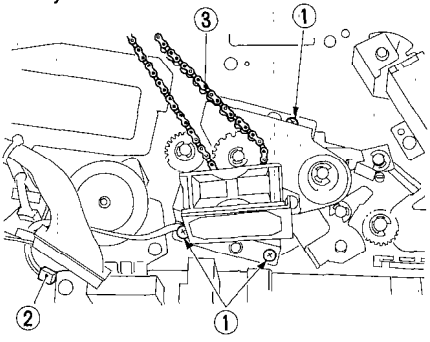
① Screws
② Primary corona wire cleaning motor assembly

Figure 4-226

H. Fixing Drive Assembly

1. Detaching the Fixing Drive Assembly

1) Detach the fixing assembly.
2) Detach the rear cover.
3) Detach the heat exhaust fan.
4) Remove the two screws, and disconnect the connector; then, detach the DC controller together with its mount.
5) Detach the fixing drive chain.
6) Remove the three screws, and disconnect the connector; then, detach the fixing drive assembly.



① Screws
② Connector
③ Fixing drive chain

Figure 4-227

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III. FEEDER SYSTEM

A. Pick-Up Assembly (1st and 2nd)

1. Construction

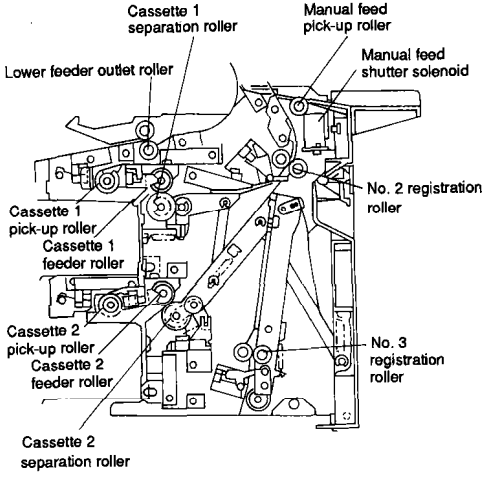
Cassette 1 separation roller
Manual feed pick-up roller
Manual feed shutter solenoid
Lower feeder outlet roller
No. 2 registration roller
Cassette 1 pick-up roller
Cassette 1 feeder roller
Cassette 2 pick-up roller
Cassette 2 feeder roller
No. 3 registration roller
Cassette 2 separation roller

Figure 4-300 Cross Section

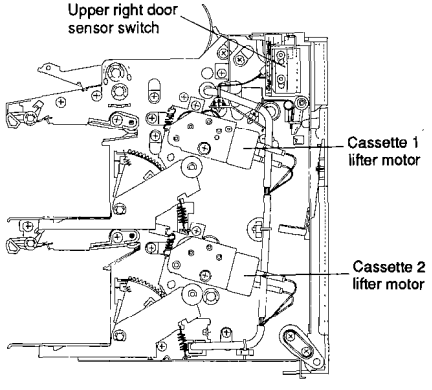

Figure 4-301 Front View

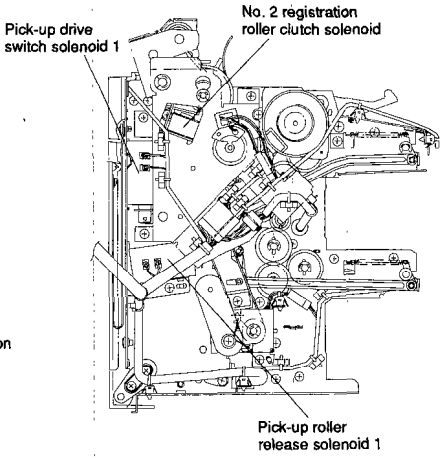

Figure 4-302 Rear View

2. Detaching the 1st/2nd Pick-Up Assembly

1) Detach the drum unit.
2) Detach the right cover.
3) Slide out the 1st and 2nd cassettes.

Note:
Do not try to detach the pick-up assemblies with the cassettes inside the copier; otherwise, the lifters would become trapped, preventing detachment of the cassettes and the pick-up assemblies.

4) Remove the two screws, and detach the lower front cover.
5) Remove the four screws, and detach the rear cover.
6) Disconnect J109 form the DC controller PCB.

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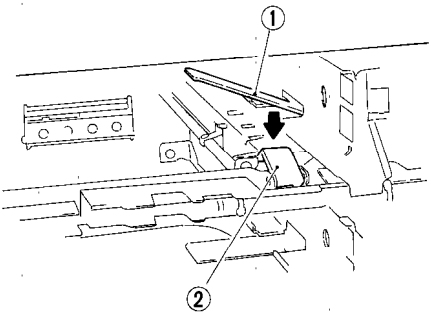
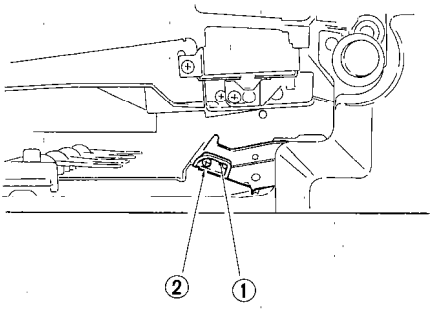
7) Shift the lifter release arm of the first and second holders into the direction of the arrow, and move the lifter down.



① Lifter ② Lifter release arm

Figure 4-303

8) Open the front door, and remove the screw; then, detach the lower feeder outlet grip assembly.

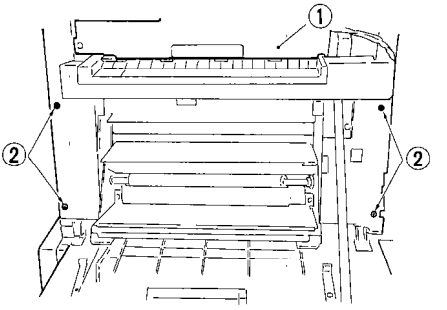


① Grip ② Screw

Figure 4-304

9) Open the upper right door, and remove the four screws.

10) Lift the manual feed tray cover, and slide the pick-up assembly to the front to detach.

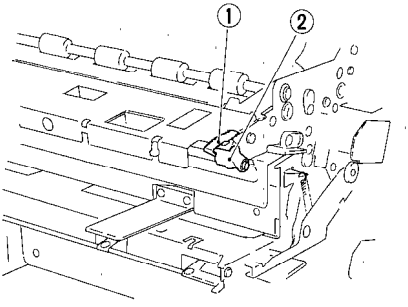


① Manual feed tray cover ② Screws (4 pcs.)

Figure 4-305

3. Detaching the 1st and 2nd Pick-Up Rollers

1) Detach the pick-up assembly from the machine.
2) Lift the pick-up roller release arm, and tape it in place.



① Tape ② Pick-up roller release arm

Figure 4-306

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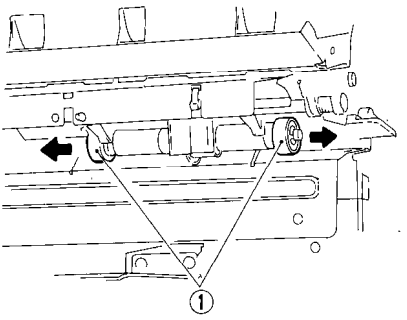
3) Pull out the pick-up rollers in the direction of the arrow.



① Pick-up rollers

Figure 4-307

Note:
The pick-up roller has its own orientation; attach it as shown in Figure 4-308.

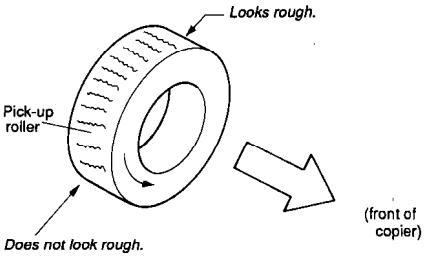
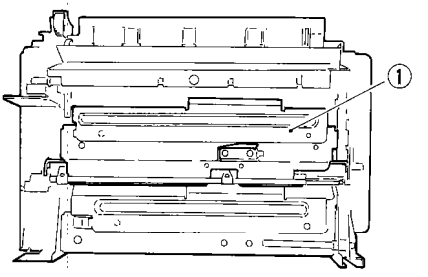


Figure 4-308

4. Detaching the 1st and 2nd Separation/Feeder Rollers

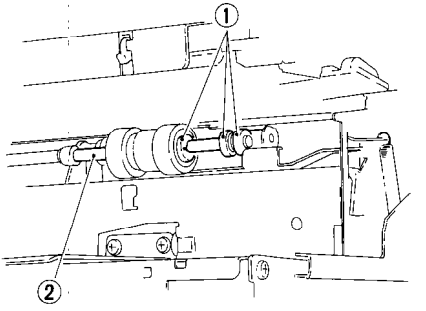
1) Detach the pick-up assembly from the machine.
2) Remove the screw, and detach the pick-up guide plate.



① Pick-up guide plate

Figure 4-309

3) Remove the three stop rings using a finger or calipers, and detach the separation roller shaft and the separation roller.



① Stop rings ① Separation roller shaft

Figure 4-310

Note:
The separation roller has its own orientation, i.e., direction of rotation. Attach the separation roller shaft to the pick-up assembly so that the arrow shown in Figure 4-311 points to the rear of the machine.

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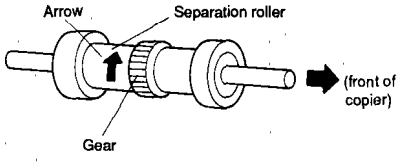
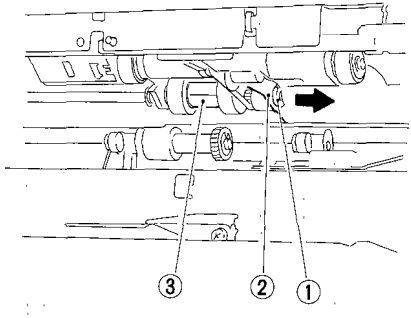


Figure 4-311

4) Remove the stop ring, and detach the feeder roller while pushing the arm into the direction of the arrow.



① Stop ring
② Arm
③ Feeder roller

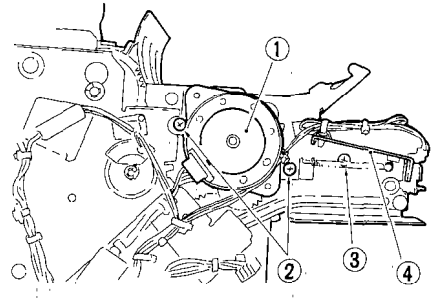
Figure 4-312

5. Detaching the Feeder Outlet Roller

1) Detach the pick-up assembly from the machine.
2) Remove the two screws; and detach the lower feeder outlet motor, the gear, and the pin.

Note:
Take care not to drop the gear and the pin.

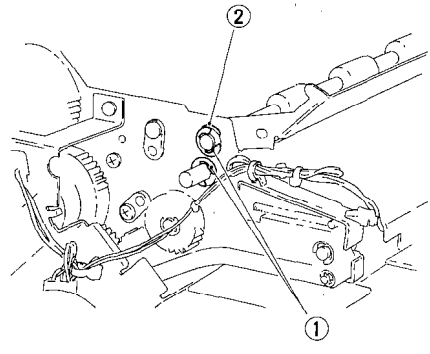
3) Remove the screw that holds the lower feeder outlet guide plate (lower) in place.



① Lower feeder outlet motor
② Screws (2 pcs.)
③ Screw (1 pc.)
④ Lower feeder outlet guide plate (lower)

Figure 4-313

4) Remove the two E-rings.
5) Remove the spring.



① E-rings (2 pcs.)
② Spring

Figure 4-314

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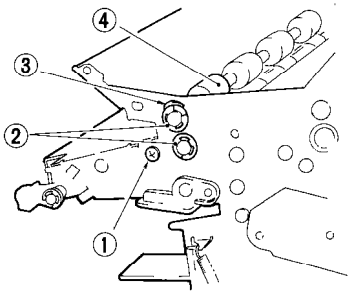
Note:
When attaching the spring, make sure its hook is on the inside of the pick-up assembly.

6) Remove the screw that holds the lower feeder outlet guide plate (lower) in place.
7) Remove the two E-rings and the spring, and detach the lower feeder outlet rollers (upper, lower).



① Screw (1 pc.)
② E-rings (2 pcs.)
③ Spring
④ Lower feeder outlet roller (upper)

Figure 4-315

Note:
When attaching the spring, make sure its hook is on the inside of the pick-up assembly.

6. Attaching the Manual Feed Shutter Assembly

① Make sure that the front end of the manual shutter sticks out from the rib face by 3 mm.
② Make sure that the front end of the manual shutter is below the reference face of the manual feed guide by 1 mm when the manual feed shutter solenoid is OFF.

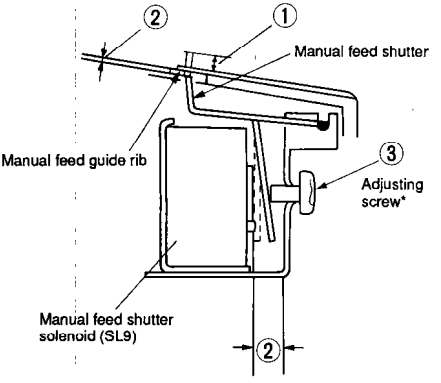


Figure 4-316

* Access through the hole shown in Figure 4-317.

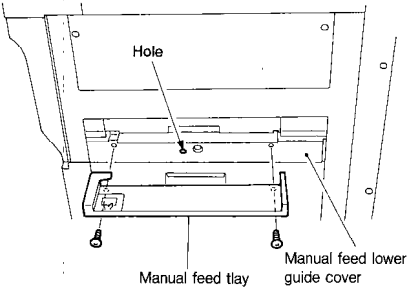


Figure 4-317

Note:
The manual feed lower guide is adjusted at the factory for horizontal registration; try not to detach it.

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7. Attaching Pick-Up Drive Switch Solenoid 1 (SL6)

Make sure that the stroke (a) of pick-up drive switch solenoid 1 (SL6) is 0.2 mm or less when the stop plate and the outside of the bushing are in contact with each other with section A held up; see Figure 4-318.

8. Attaching Pick-Up Roller Release Solenoid 1 (SL7)

Make sure that the stroke (b) of pick-up roller release solenoid 1 (SL7) is 0.2 mm or less when the 1st pick-up roller or the 2nd pick-up roller is released; see Figure 4-318.

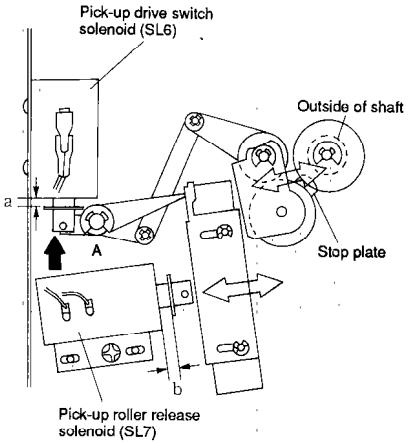
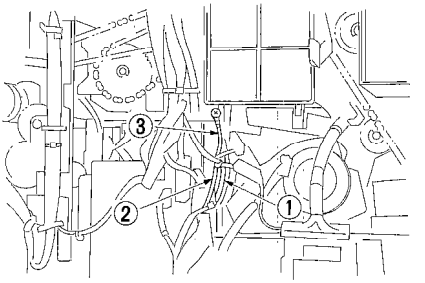


Figure 4-318

B. Feeder Assembly

1. Detaching the Feeder Assembly

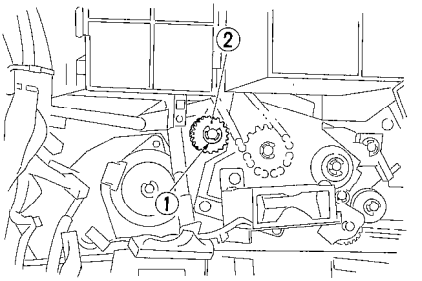
1) Detach the CD unit.
2) Enter the service mode (*4*), and release the black developing assembly by 'DEV_REL'.
3) Detach the rear cover.
4) Detach the DC controller together with its mount.
5) Disconnect the transfer high-voltage connector (T) and the separation high-voltage connector (S).
6) Detach the grounding cord.
7) Put the transfer/separation high-voltage cord, the grounding cord, and the feeder fan cord into the inside of the copier.



① Feeder fan cord ③ Grounding cord
② High-voltage cable

Figure 4-319

8) Remove the E-ring, and detach the gear (w/ pin).



① E-ring ② Gear

Figure 4-320

Note:
Take care not to lose the pin.

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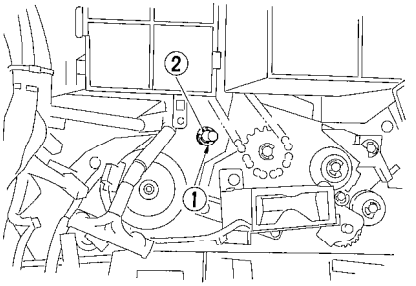
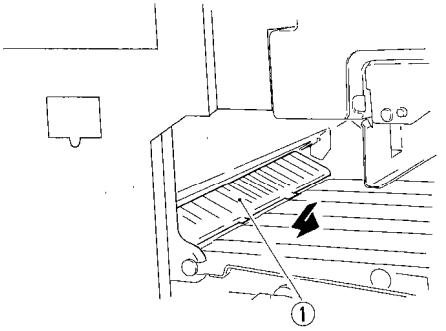
9) Remove the E-ring, and pull out the bushing.



① E-ring ② Bushing

Figure 4-321

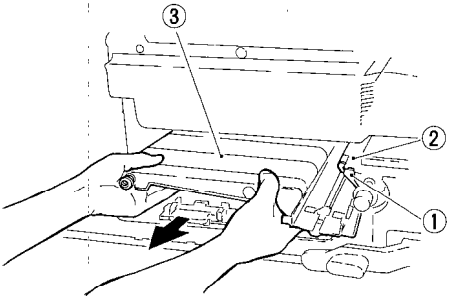
10) Open the front door, and detach the pre-transfer corona assembly.
11) Detach the drum unit and the transfer/separation corona assembly.
12) Detach the fixing assembly paper guide.



① Fixing assembly paper guide

Figure 4-322

13) Tape the lower transfer guide assembly to the upper transfer guide assembly.
14) Lift the front of the feeder assembly, and slide it out to the front.

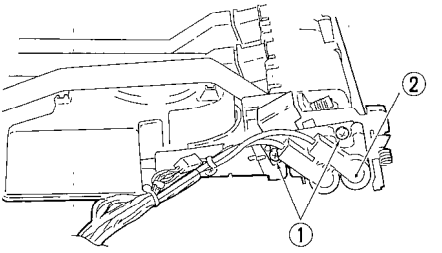


① Lower transfer guide assembly
② Upper transfer guide assembly
③ Feeder assembly

Figure 4-323

2. Detaching the Feeder Belt

1) Detach the feeder assembly.
2) Remove the screw, and detach the transfer/separation electrode.



① Screws
② Transfer/Separation electrode

Figure 4-324

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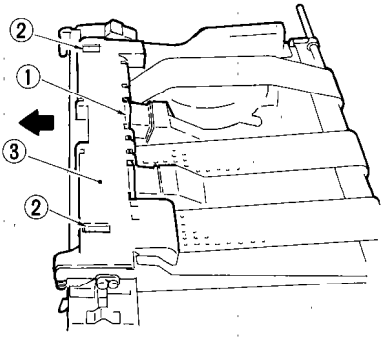
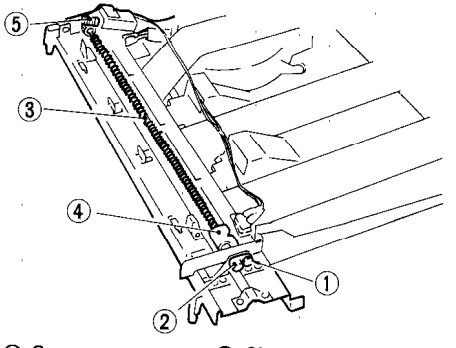
3) Detach the harness of the transfer/separation cleaner home position sensor (MS5) from the guide.
4) Disengage the two hooks, and pull out the duct in the direction of the arrow.



① Harness
② Hooks
③ Duct

Figure 4-325

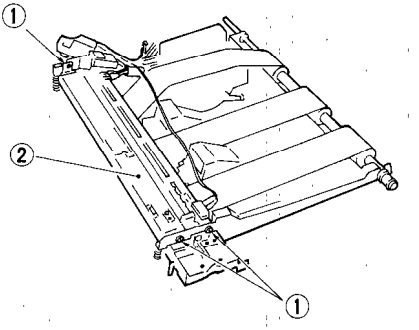
5) Remove the screw, and detach the bushing of the feedscrew.
6) Move the feedscrew to the front, and detach it from the motor gear.
7) Turn the feedscrew clockwise, and detach it from the cleaner.



① Screw
② Bushing
③ Feedscrew
④ Cleaner
⑤ Motor gear

Figure 4-326

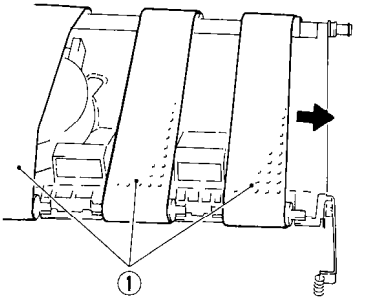
8) Remove the three screws, and detach the corona assembly rail mount.



① Screws
② Corona assembly rail mount

Figure 4-327

9) Detach the feeder belts.



① Feeder belts

Figure 4-328

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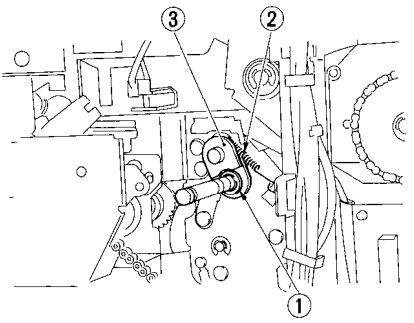
3. Detaching the Registration Roller/ Transfer Guide

1) Detach the CD unit and black developing assembly; see p. 4-51.
2) Detach the pre-transfer corona assembly.
3) Detach the drum unit.
4) Detach the rear cover and the right cover.
5) Detach the pick-up assembly; see p. 4-16.
6) Detach the No. 1 registration roller drive assembly; see p. 4-11.
7) Remove the E-ring and the spring at the rear.
8) Detach the felt cover.

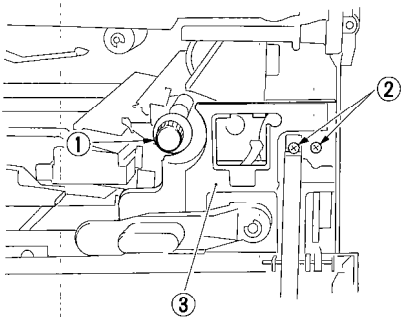
Note:
Detaching the felt cover detaches the bushing of the registration roller (lower).



① E-ring
② Spring
③ Felt cover

Figure 4-329

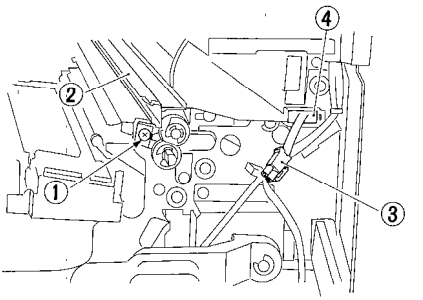
9) Detach the registration roller knob.
10) Remove the two screws, and detach the inside lower right cover.



① Registration roller knob
② Screws
③ Inside lower right cover

Figure 4-330

11) Remove the screw, and detach the pre-transfer corona assembly rail.
12) Remove the connector, and push it into the hole.



① Screw
② Pre-transfer corona rail
③ Connector
④ Hole

Figure 4-331

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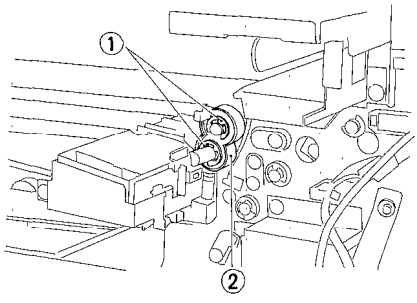
13) Remove the two E-rings, and detach the gear cover.



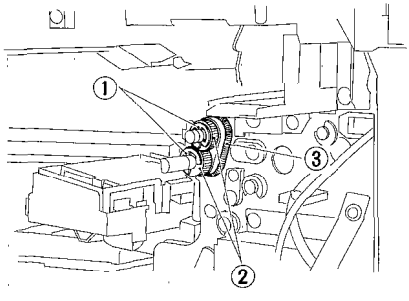
① E-rings ② Gear cover

Figure 4-332

14) Remove the two E-rings, and detach the two gears (w/ pin).

Note:
Keep the gear and the pin together.

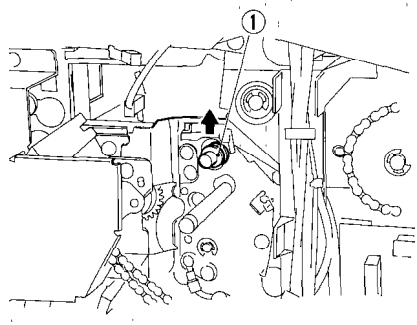
15) Detach the spring.



① E-rings ③ Spring
② Gears

Figure 4-333

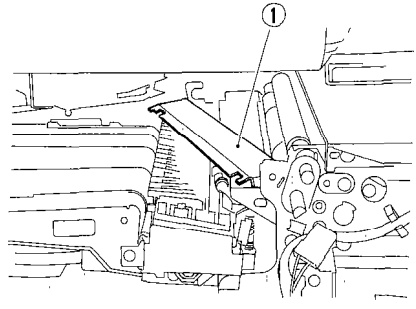
16) Lift the registration roller (upper) at the rear, and detach the bushing.



① Bushing

Figure 4-334

17) Detach the upper transfer guide assembly from the bushing.



① Upper transfer guide assembly

Figure 4-335

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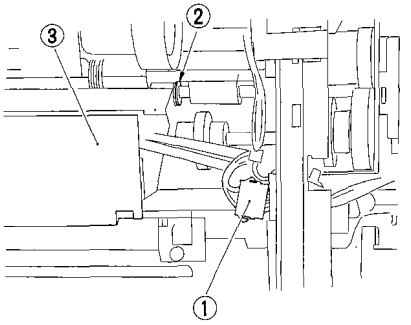
18) Remove the connector from the manual feed guide assembly.
19) Move the bushing to the right, and detach the manual guide assembly.

Note:
Take care not to butt the horizontal paper edge sensor (Q6) attached to the manual guide assembly against the paper guide plate.

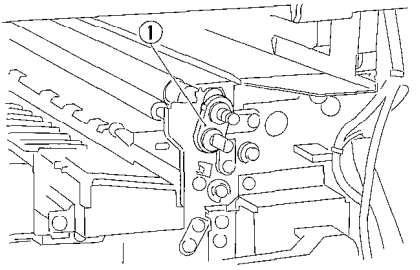


① Connector ③ Manual guide assembly
② Bushing

Figure 4-336

20) Detach the felt cover at the front.

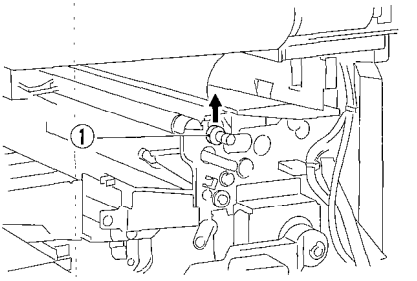
Note:
Detachment of the felt cover detaches the bushing of the registration roller (lower).



① Felt cover

Figure 4-337

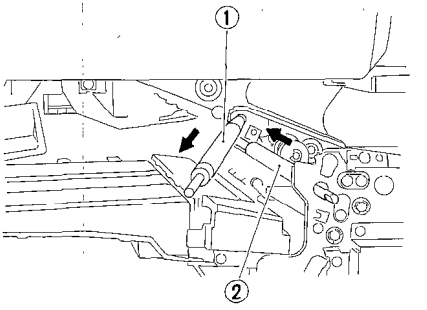
21) Lift the registration roller (upper), and detach the bushing.



① Bushing

Figure 4-338

22) Move the registration roller to the rear, and move it to the front to detach.



① Registration roller (upper)
② Registration roller (lower)

Figure 4-339

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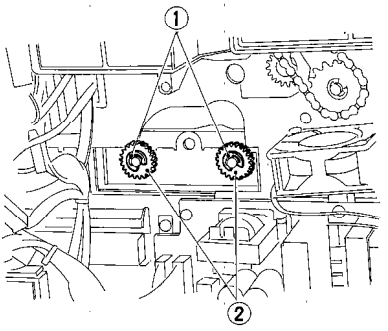
C. Lower Feeder Assembly

1. Detaching Set-Back Rollers 1 and 2

1) Detach the rear cover.
2) Detach the DC controller together with its mount.
3) Detach the lower feeder drive assembly.
4) Remove the E-rings, and pull out the gear (w/ pins).

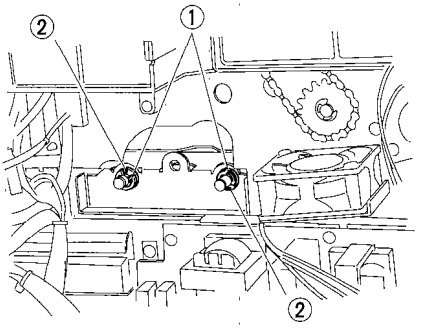
Note:
Keep the gear and the pin together.



① E-rings ② Gears (w/ pin)

Figure 4-340

5) Remove the E-rings, and pull out the bushings.

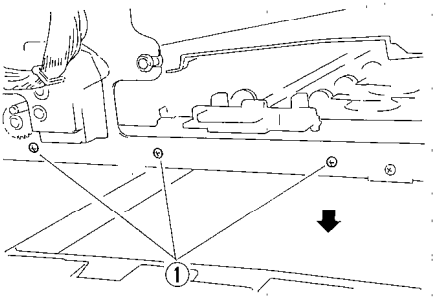


① E-rings ② Bushings

Figure 4-341

6) Open the front door and the delivery assembly.
7) Detach the inside left cover.
8) Detach the front door.
9) Slide out the 1st and 2nd cassettes.
10) Detach the lower front cover.

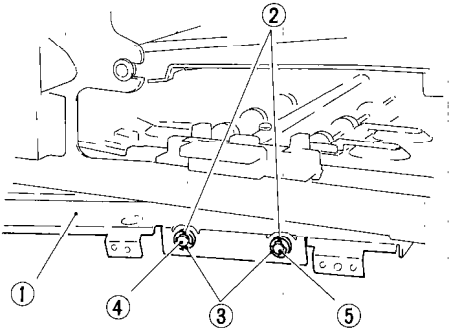
11) Remove the three screws, and push down the lower feeder assembly into the direction of the arrow.



① Screws

Figure 4-342

12) Remove the E-rings and detach the bushings; then, detach set-back rollers 1 and 2.



① Lower feeder assembly
② E-rings
③ Bushings
④ Set-back roller 1
⑤ Set-back roller 2

Figure 4-343

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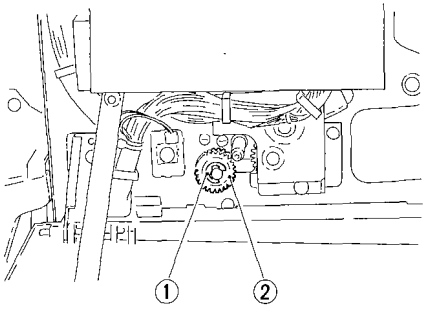
2. Detaching the Lower Feeder Inlet Roller

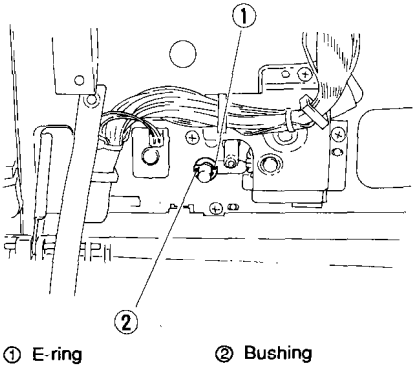
1) Open the front door.
2) Detach the inside left cover.
3) Remove the E-ring, and pull out the gear.



① E-ring ② Gear

Figure 4-344

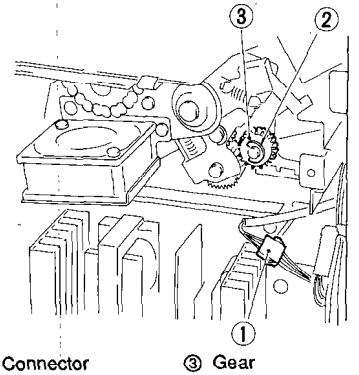
4) Remove the E-ring, and detach the bushing.



① E-ring ② Bushing

Figure 4-345

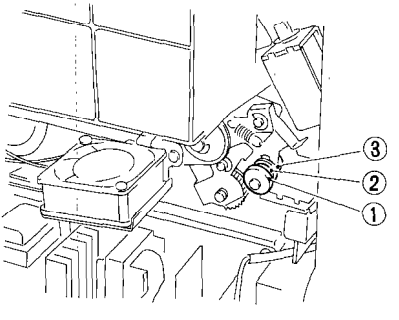
5) Detach the rear cover.
6) Detach the DC controller together with its mount.
7) Disconnect the connector.
8) Remove the E-ring, and detach the collar and the gear (w/ pin).



① Connector ③ Gear
② E-ring

Figure 4-346

9) Detach the collar and remove the E-ring; then, detach the bushing.



① Collar ③ Bushing
② E-ring

Figure 4-347

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5) Move the lower feeder inlet roller assembly to the rear of the machine, and match the flat cut-out of the shaft with the slit of the rear plate; then, pull the lower feeder inlet roller assembly in the direction of the arrow to detach.

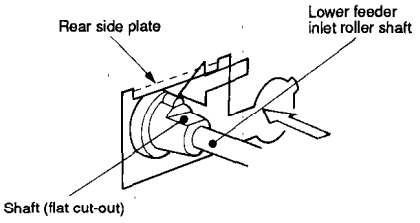
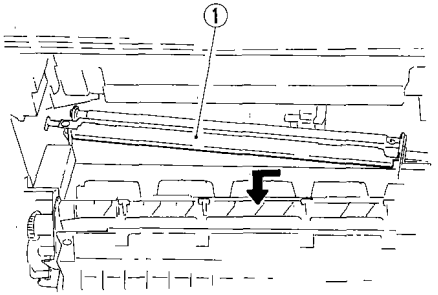


Figure 4-348



① Lower feeder inlet roller assembly

Figure 4-349

D. Delivery Assembly

1. Construction

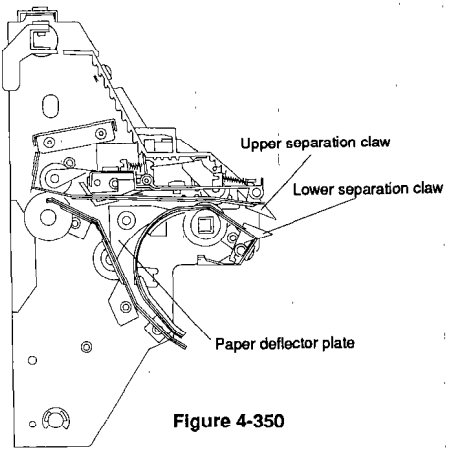


Figure 4-350

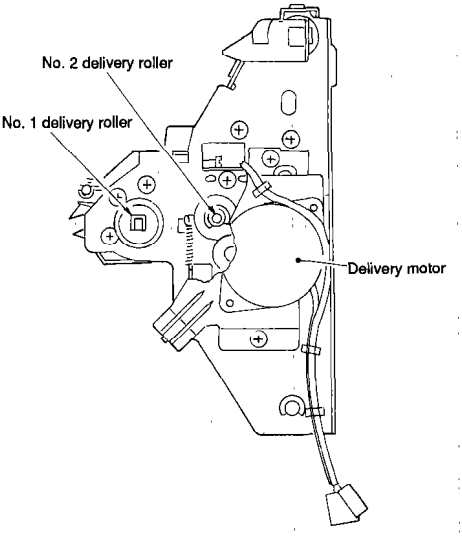


Figure 4-351

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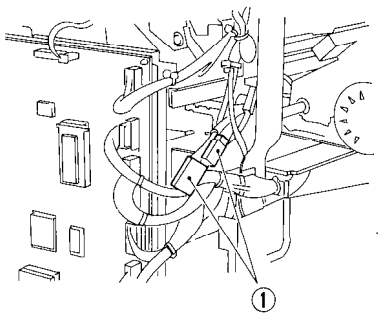
2. Detaching the Delivery Assembly

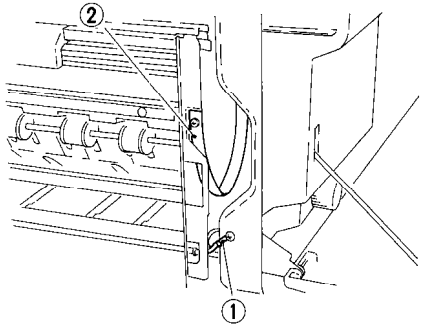
1) Detach the rear cover.
2) Detach the lower front cover.
3) Detach the left cover.
4) Open the front door.
5) Remove the two screws, and detach the delivery cover.
6) Disconnect the two connectors (6-pin, 3-pin) from the delivery assembly, and push them inside the machine.



① Connectors

Figure 4-352

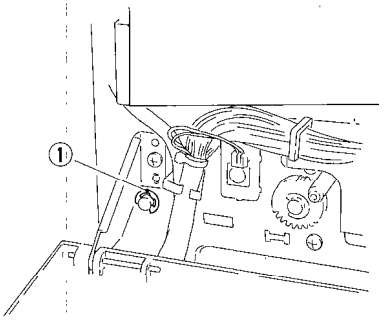
7) Close the delivery assembly, and remove the door tape.
8) Remove the screw, and detach the grounding wire.



① Grounding wire ② Door tape

Figure 4-353

9) Detach the inside left cover.
10) Remove the E-ring.



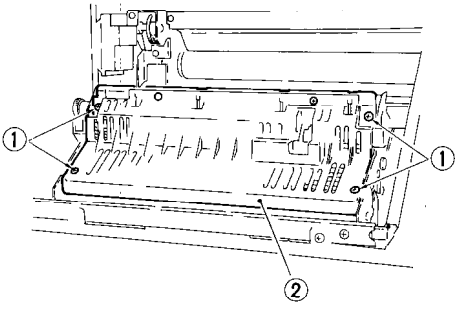
① E-ring

Figure 4-354

11) Open the delivery assembly, and move it to the rear to detach.

3. Detaching the Upper Separation Claw

1) Open the delivery assembly.
2) Remove the four screws, and detach the upper cover.



① Screws (4 pcs.) ② Upper cover

Figure 4-355

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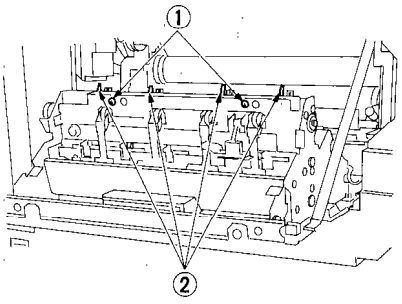
3) Remove the two screws, and detach the upper separation claw.



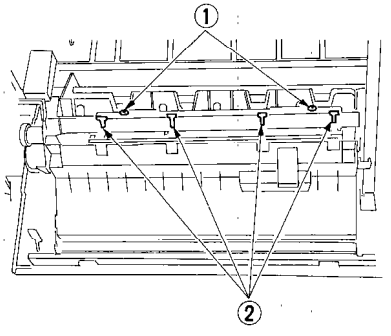
① Screws (2 pcs.) ② Upper separation claws

Figure 4-356

Note:
Make sure that the upper separation claws are fitted in the screw holes on the left (Figure 4-356).

4. Detaching the Lower Separation Claw

1) Open the delivery assembly.
2) Remove the two screws, and detach the lower separation claws.



① Screws (2 pcs.) ② Lower separation claws

Figure 4-357

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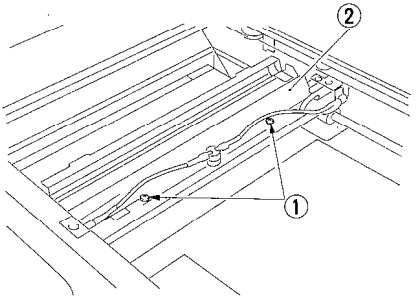
IV. EXPOSURE SYSTEM

A. Exposure Assembly

Note:
Make sure that the power plug is disconnected when disassembling or checking the exposure assembly.

1. Detaching the Scanning Lamp

1) Detach the copyboard glass.
2) Remove the two screws, and detach the upper reflecting plate.

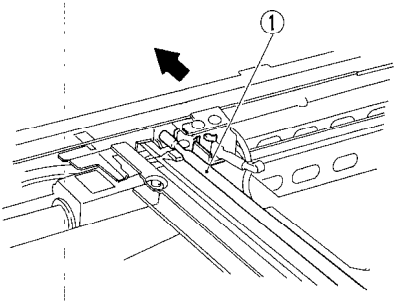


① Screws (M4×10) ② Upper reflecting plate

Figure 4-400

3) Hold the scanning lamp at the front, and detach it while pushing it to the rear.

Note:
When detaching the scanning lamp, take care not to hit it against the side reflectors (front, rear; Figure 4-402); mark the positions of the reflectors using a scriber when detaching the reflectors to avoid the problem.



① Scanning lamp

Figure 4-401

Note:
1. Make sure that the scanning lamp is not hot before starting the work.
2. Do not leave fingerprints on the scanning lamp.
3. If the scanning lamp is soiled, dry wipe it.

2. Adjusting the Position of the Side Reflecting Plate

If necessary, move the side reflecting plate of the No. 1 mirror mount into the direction shown in Figure 4-402 to increase the intensity at the ends for lighter image edges on the copies.

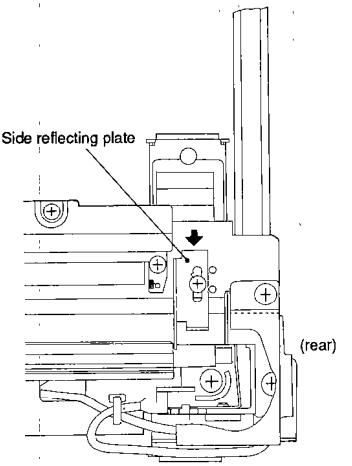


Figure 4-402

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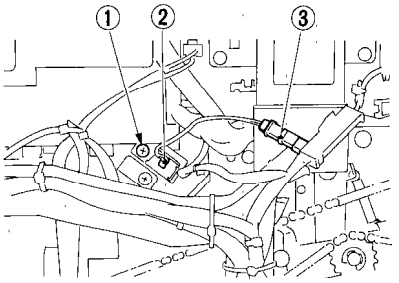
B. Pre-Exposure Lamp Assembly

1. Removing the Pre-Exposure Lamp

1) Detach the rear cover.
2) Remove the screw shown in Figure 4-403.
3) Pull out the pre-exposure lamp, and disconnect the connector (J35).



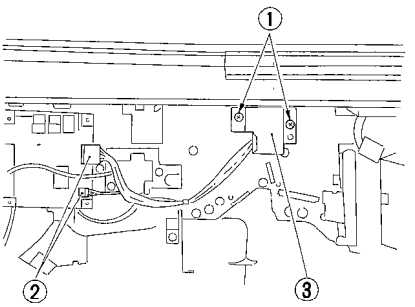
① Screw ③ Connector
② Pre-exposure lamp

Figure 4-403

C. CCD Unit

1. Detaching the CCD Unit

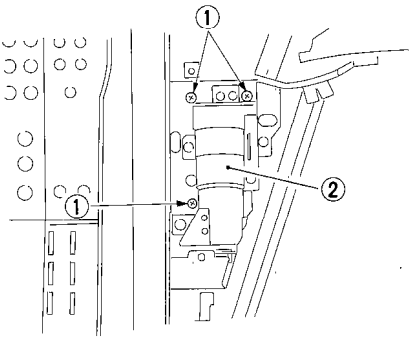
1) Pull out the CD unit.
2) Release the black developing assembly using 'DEV-REL' in the service mode (✳4✳).
3) Detach the drum unit.
4) Detach the inside left cover and the shielding plate of the image processor PCB.
5) Disconnect the two connectors, and remove the two screws; then, detach the CCD driver PCB.



① Screws ③ Cover
② Connectors

Figure 4-404

6) Detach the copyboard glass.
7) Detach the lens mount cover.
8) Remove the three screws, and detach the CCD unit.



① Screws ② CCD unit

Figure 4-405

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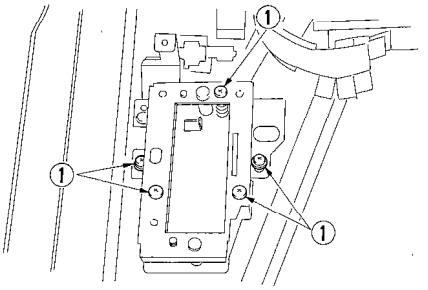
Note:
The CCD unit mount is adjusted with precision at the factory before shipment; do NOT touch the screws shown Figure 4-406.



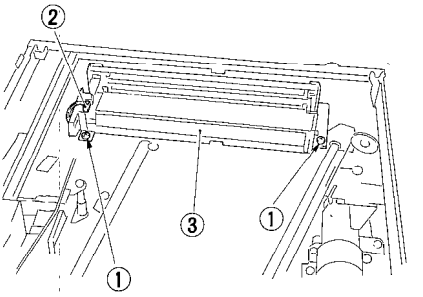
① Screws

Figure 4-406

D. Filter Unit

1. Detaching the Filter Unit

1) Detach the copyboard glass.
2) Detach the lens mount cover.
3) Disconnect the connector, and remove the two screws.
4) Detach the filter unit while taking care not to bend the light-blocking sheet; avoid contact with the C- and R- filters.



① Screws
② Connector
③ Light-blocking sheet

Figure 4-407

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E. Laser Scanner Assembly

1. Outline

The laser scanner assembly is consists of the laser unit, laser scanner motor, and polygon mirror.

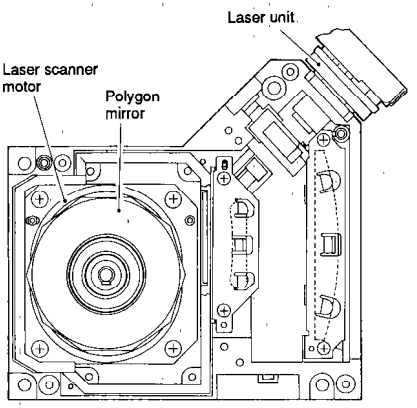
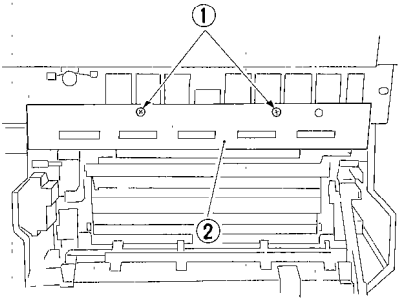


Figure 4-408

Note:
The unit is pre-adjusted at the factory with high precision. The laser unit is the only part that can be replaced in the field. If replacement of the laser unit components is necessary, replace the laser scanning unit as a whole.

2. Detaching the Laser Scanner Assembly

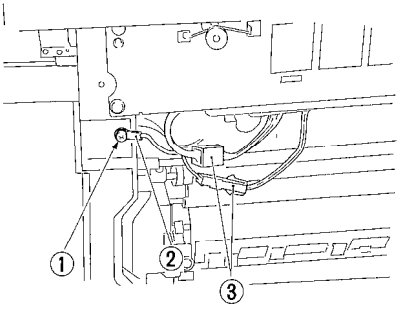
1) Detach the left cover.
2) Remove the two screws, and detach the cover.



① Screws ② Cover

Figure 4-409

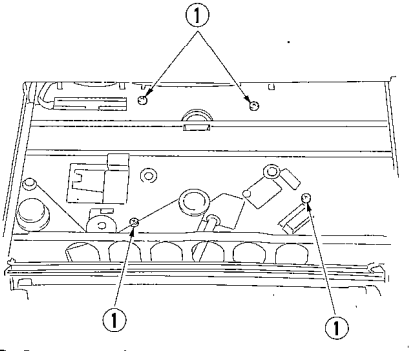
3) Remove the screw, and detach the grounding wire.
4) Disconnect the two connectors.



① Screw ③ Connectors
② Grounding wire

Figure 4-410

5) Detach the copyboard glass.
6) Move the No. 1 mirror mount to the right until it stops.
7) Hold the laser scanner assembly, and remove the four screws.



① Screws

Figure 4-411

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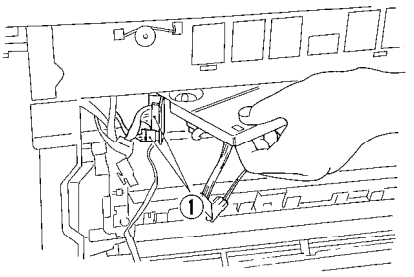
7) Pull out the laser scanner assembly carefully, and disconnect the two connectors.



① Connectors

Figure 4-412

Note:
The copier does not require the use of a shorting connector to protect against static damage to the laser unit.

F. BD Unit

If the laser scanner assembly or the BD unit has been replaced or detached, adjust the position of the BD unit as follows to prevent BD errors (E100) or white spots (main scanning direction).

1) Turn the power switch OFF.
2) Open the front door.
3) Detach the inside left cover and the inside middle cover.
4) Mark the position of the BD adjusting plate using a scriber.
5) Detach the old BD unit, and attach the new BD unit over the scribed position.
6) Insert the door switch actuator into the door switch.
7) Turn the power switch ON.
8) Wait until the wait period is over; then, select 'LSR_MRR' in the service mode (*4*).
9) Press the OK key to turn the laser beam ON.
10) Adjust the BD adjusting plate by moving it up and down so that the setting of 'LSR_MRR' is '0'.

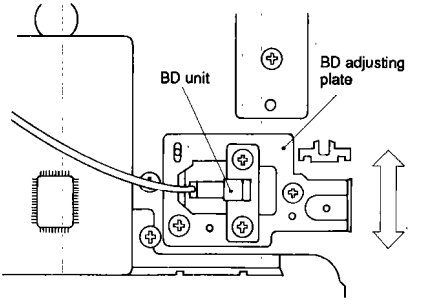


Figure 4-413

11) Move the BD adjusting plate up, and mark its position using a sciber when '0' has changed to '1'.
12) Move the BD adjusting plate down, and mark the position at which the display on the control panel changes from '0' to '1'.
13) Fix the BD adjusting plate in place centered over the position described in steps 11) and 12).
14) Check that the display on the control panel indicates '0'.
15) Press the OK key once again to turn the laser beam OFF.
16) Attach the parts.

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Note:
'LSR_MRR' represents a BD error; '0' indicates normal and '1', BD error.

✳ 4 ✳	FUNCTION
	1 ← Indicates BD error
LSR_MRR	: 0 〔OK : ON〕

Figure 4-414

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G. Laser Mirror

1. Outline

The copier uses laser beams for blank exposure, area, add-on, and screen modes. For this reason, copies of half-tone documents (photos) made in the screen mode tends to be uneven when the laser exposure system becomes soiled.

Of the parts in the laser exposure system, the collimating lens (shaded), dust-proof glass, and laser mirror require cleaning; use a blower brush for the collimating lens and lint-free paper for the dust-proof glass. Follow the following procedure to clean the laser mirror.

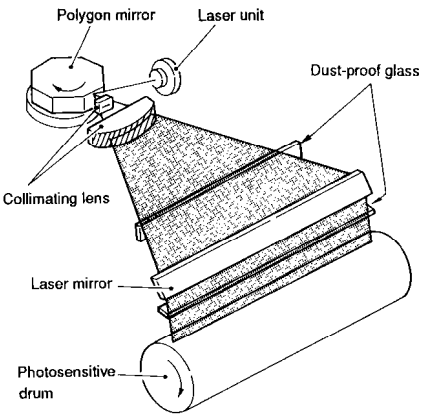

Figure 4-415

2. Cleaning

a. Before Work (wrapping the tool with lint-free paper)

1) Fold a sheet of lint-free paper (80 x 160 mm) in half.

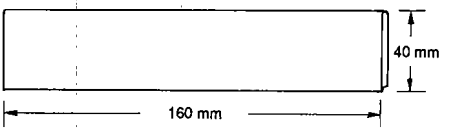

Figure 4-416

2) Place the tool in half-way on the lint-free paper, and fold over the paper.

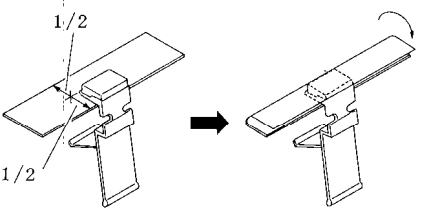

Figure 4-417

3) Twist both ends of the lint-free paper as shown, and bring the ends together behind the sponge; then, lead the ends into the cut-out.

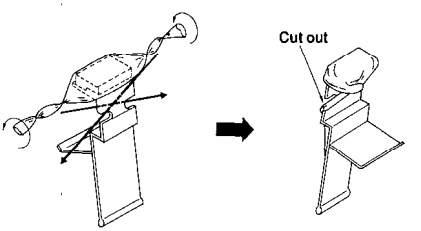

Figure 4-418

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b. Cleaning the Laser Mirror

1) Detach the CD unit.
2) Open the front door, and insert the door switch actuator into the door switch; then, execute 'DEV-REL' in the service mode to release the black developing assembly.
3) Remove the door switch actuator, and release the feeder assembly; then, open the hopper, and pull out the pre-transfer corona assembly.
4) Detach the drum unit.
   - Put the drum unit into a black plastic bag to block out the light; work quickly.
5) Pull out the two sheets of dust-proof glass.
6) Hold the tool wrapped in lint-free paper as shown; while butting both sides shown in Figure 4-419 against the copier's rail, move it back and forth to clean the mirror.

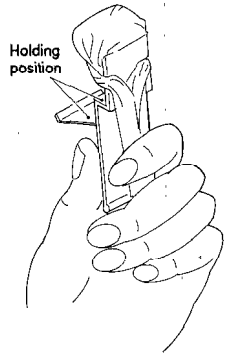

Figure 4-419

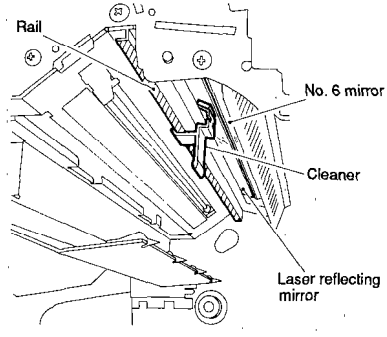

Figure 4-420

Note:

i. Take care not to injure fingers with the drum separation claw; be careful not to damage the tip of the claw.
ii. Do not touch the cylinder of the black developing cylinder.
iii. Change the lint-free paper for each use of the tool.
iv. If the dirt on the laser mirror is conspicuous, suspect the following: the dust-proof glass may not have been set properly or the developing assembly or the cleaner may not have been sealed properly.

7) Attach the parts in reverse order.

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V. CORONA ASSEMBLIES

A. Drum Unit

1. Outline

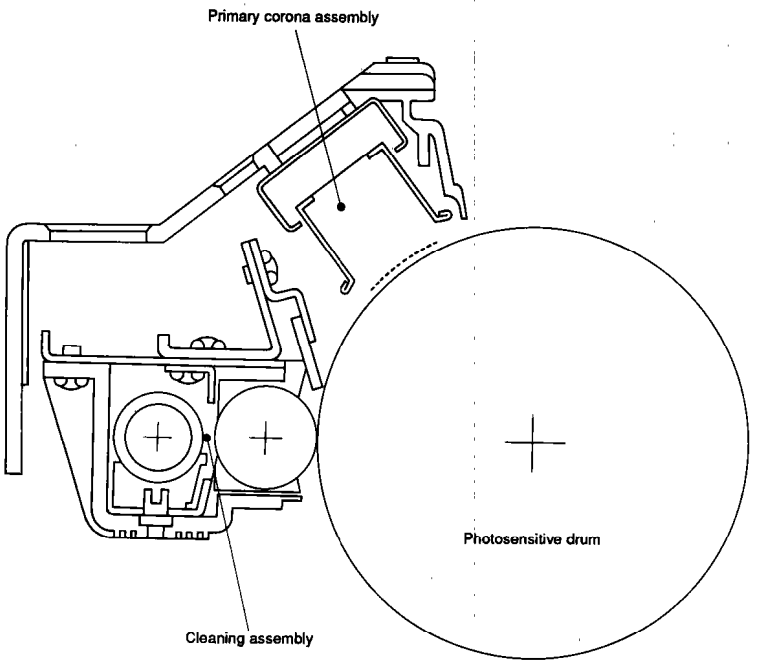

Figure 4-500

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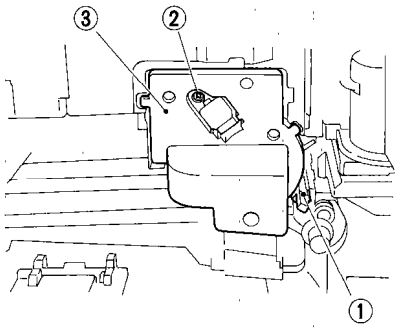
2. Detaching the Drum Unit

1) Detach the CD unit.
2) Enter the service mode (*4*), and release the black developing assembly using 'DEV_REL'.
3) Release the feeder assembly.
4) Open the hopper.
5) Pull out the pre-transfer corona assembly.
6) Remove the screw, and pull out the drum unit.



① Pre-transfer corona assembly
② Screw
③ Drum unit

Figure 4-501

7) Hold the drum unit as shown in Figure 4-502, and detach it.

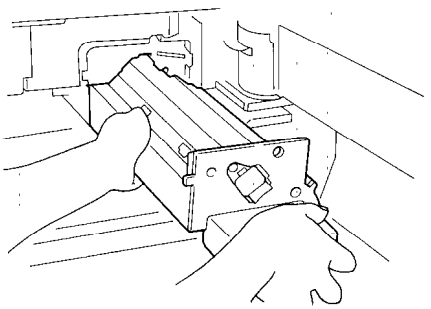


Figure 4-502

Note:
The copier's photosensitive drum is susceptible to light; room lights are enough to cause changes in its photo medium, resulting in copies with white spots and black lines. Wrap the drum in a light-blocking sheet (or fresh copy paper) as soon as it is taken out of the machine, and place it on a flat surface and keep it in a dark place.

Note:
i. The drum separation claw is disengaged automatically when the drum unit is inserted; do not touch the drum separation claw.
ii. Make sure that the drum separation claw is in contact with the drum after attaching the drum unit.

3. Replace the drum unit

Make adjustments as follows if the drum unit has been replaced.

1) Set the Test Sheet on the copyboard.
2) Make a black copy; non-AE, copy density at 5, and DIRECT. Then, check the copy image.
3) If the background is foggy, make adjustments using 'LIGHT_BK' in the service mode (*3*).
4) Make a black copy; red elimination, non-AE, copy density at 5. Then, check the copy image.
5) If the background is foggy, make adjustments using 'LIGHT_R' in the service mode (*3*).
6) Place five A4 blank sheets of paper on the copyboard.
   (If possible, use Canon-recommended paper.)
7) Select 'CCD_LAMP' in the service mode (*4*); then, press the OK key.
8) Set the Test Sheet on the copyboard, and make copy; then, check the copy image.

4. Detaching the Photosensitive Drum

1) Detach the drum unit from the copier.

Note:
i. Protect the photosensitive drum against light to prevent residual memory on its medium.
ii. Take care no to damage the photosensitive drum when detaching the toner receptacle

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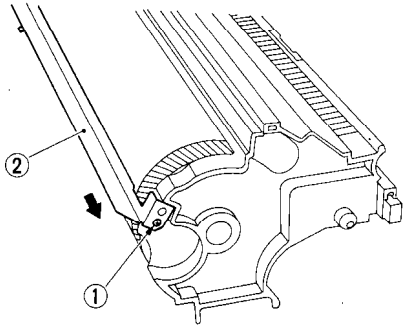
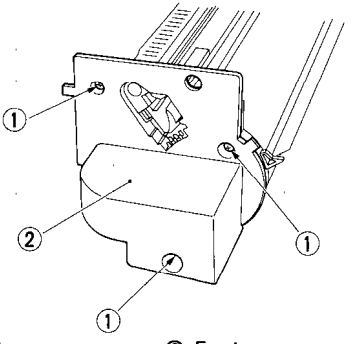
2) Remove the mounting screw (M3x6) from the toner receptacle, and move the receptacle into the direction of the arrow to detach.



① Screw ② Toner receptacle

Figure 4-503

3) Detach the primary corona assembly.
4) Remove the three screws, and detach the front cover of the drum unit.

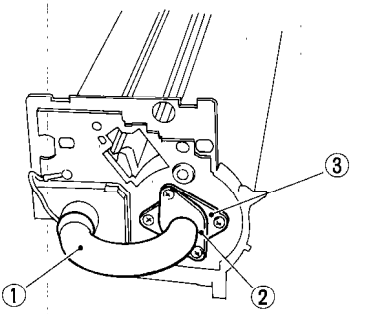


① Screws ② Front cover

Figure 4-504

5) Pull out the screwpipe on the drum support shaft side; remove the two screws each (M4), and detach the drum inside support shaft and the drum support shaft.

Note:
Take care so that toner will not fall out when detaching the screwpipe.

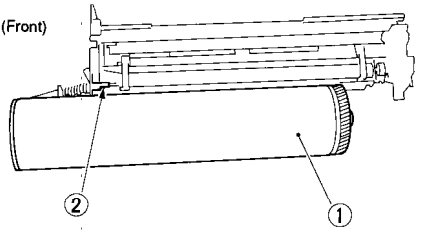


① Screwpipe ③ Drum support shaft
② Drum inside support shaft

Figure 4-505

6) Move the photosensitive drum to the front, and detach it from the rear.

Note:
i. Take care so that the photosensitive drum will not hit against the protrusion.
ii. The detachment causes the drum bushing at the rear to come off together.
iii. Tape the opening to prevent toner from falling out of the photosensitive drum.



① Photosensitive drum ② Protrusion

Figure 4-506

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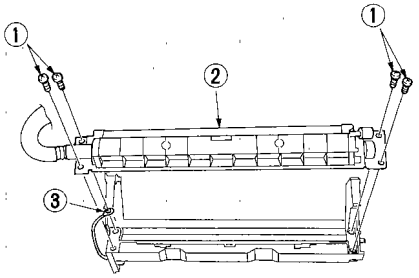
5. Detaching the Drum Cleaning Unit from the Drum Unit

1) Detach the photosensitive drum.
2) Remove the four screws, and detach the drum cleaning unit; one of the screws is used to hold the grounding wire in place.



① Screws
② Drum cleaning unit
③ Grounding wire

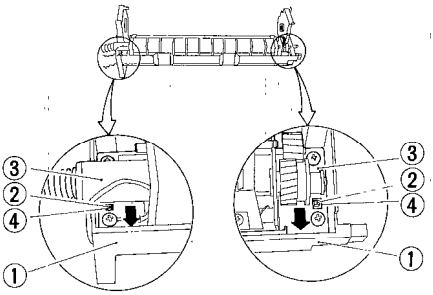
Figure 4-507

Note:

i. Take care not to damage the cleaning blade and the cleaning roller.
ii. Do not loosen screws other than those mentioned.
iii. Take care not to spill the waste toner.

6. Points to Note When Attaching the Drum Cleaning Unit

Fit the bosses at the front and the rear of the cartridge frame into the holes in the drum cleaning unit; fix the unit in place while pushing it in the direction of the arrow using screws; see Figure 4-508.



① Cartridge frame
② Bosses
③ Drum cleaning unit
④ Hole

Figure 4-508

7. Cleaning

If the surface of the photosensitive drum is soiled, wipe it using a flannel cloth coated with toner; do not use paper, lint-free or otherwise.

Note:
Do not dry wipe the surface or use solvent; do not use drum cleaning powder.

8. Points to Keep in Mind When Replacing the Drum Unit

Record the date of replacement and the counter readings on the label (Figure 4-509) after replacing the drum unit; attach the label on the front cover of the new drum unit.

日付 date date Datum	カウンター counter compteur Zahler	備考 notes note Notiz

Figure 4-509

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9. Waste Toner

a. Outline

The waste toner collected by the cleaning assembly is stored in the photosensitive drum. When the drum becomes full of waste toner, the 'DISPOSE OF TONER' message appears on the display.

Replace the drum unit when the message appears.

Note:
About 200 copies may still be made after the message has appeared; however, replace the drum unit as soon as possible when the message appears.

B. Corona Assembly

1. Outline

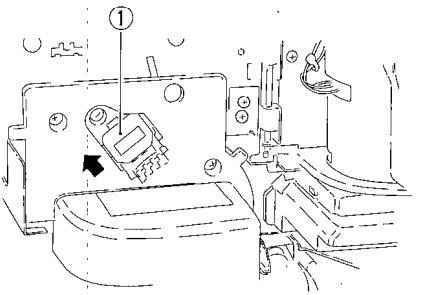
The photosensitive drum is surrounded by three corona assemblies: primary, pre-transfer, and transfer/separation corona assemblies.

The primary corona assembly is equipped with a grid of wire (16 runs).

The grid wire is a corona wire 0.1 mm in diameter; other corona wires are 0.06 mm in diameter. The corona wires are gold-plated; although the grid wire is not, a gold-plated corona wire may be substituted in the field.

2. Detaching the Primary Corona Assembly

1) Lift the primary corona assembly, and slide it out.



① Primary corona assembly

Figure 4-510

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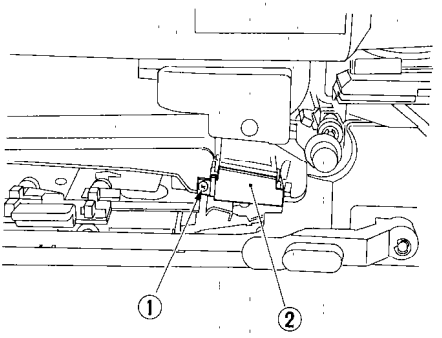
3. Detaching the Transfer/Separation Corona Assembly

1) Open the front door.
2) Release the feeder assembly.
3) Remove the screw, and detach the transfer/separation corona assembly cover.



① Screw
② Transfer/Separation corona assembly cover

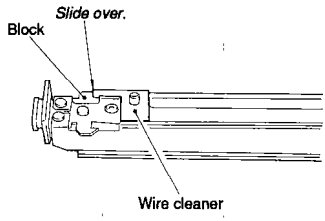
Figure 4-511

4) Slide out the transfer/separation corona assembly.

4. Routing the Corona Wire for the Primary, Pre-Transfer, and Transfer/Separation Corona Assemblies

1) Slide the wire cleaner over the block of the corona assembly as shown in Figure 4-512, and detach it.

■ Primary Corona Assembly



■ Transfer/Separation Corona Assembly

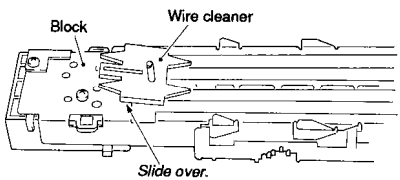


Figure 4-512

2) For the primary corona assembly,
Remove the screw, and detach the shield plate.
For the separation corona assembly,
Remove the screw, and open the shield plate; then, detach the paper guide.
3) Move the two covers of the corona assembly to the end of the assembly to detach.
4) Free about 4 mm of corona wire from its reel (0.06-mm dia.), and form a loop about 2 mm in diameter.

Note:
When forming a loop, wind the wire around a hex key once; then, turn the hex key three to four times, and then twist the wire.

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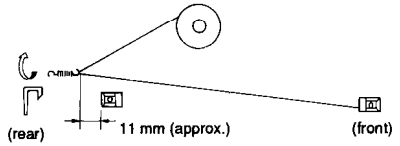
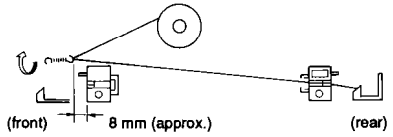
5) Cut the end (excess) of the twisted end to 1 mm or less using a nipper or cutter.
6) Hook the loop of the corona wire as shown in Figure 4-513, and route it along the V-groove of the height adjusting roll.
   Hook the corona wire tensioning spring on the corona wire, and twist the spring three to four times as shown in Figure 4-513.

■ Primary Corona Wire



■ Transfer/Separation Corona Assembly



■ Pre-Transfer Corona Assembly

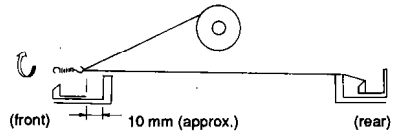


Figure 4-513

7) Cut the excess corona wire to 1 mm or less using a nipper or cutter.
8) Pick the end of the corona wire tensioning spring using tweezers, and hook it on the corona electrode.

Note:
Check the following:
- The corona wire is free of breaks and twists, and its gold-plating has not peeled.
- The corona wire is free of slack.
- The corona wire is routed through the V-groove of the height adjusting roll.
- The gut wire of the transfer/separation corona assembly is routed through the groove.
- The corona wire is in the pad of the wire cleaner; i.e., when attaching the wire cleaner.

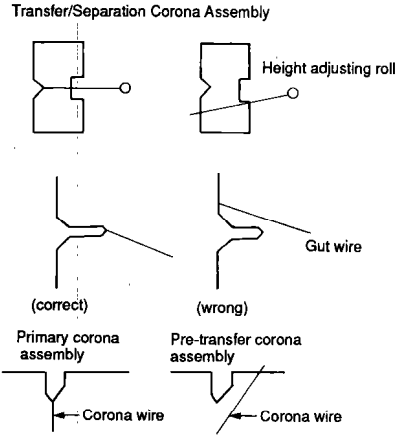


Figure 4-514

Note:
Silicone grease is applied along the V-groove of the height-adjusting roll of the transfer/separation corona assembly to prevent vibration of the corona wire; if necessary, apply silicone grease (CK-0439) along the groove, taking care so it will not seep out the groove.

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Note:
Attach the wire cleaner to the transfer/separation corona assembly so that the pad of the wire cleaner will open; attach it from the front.

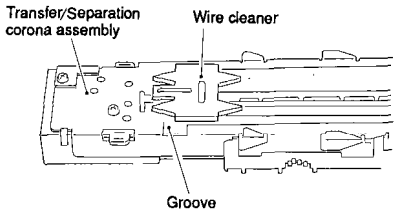
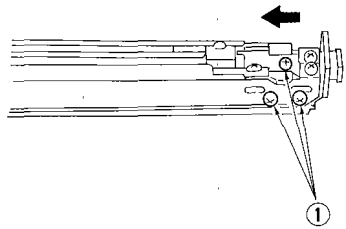


Figure 4-515

5. Routing the Grid Wire for the Primary Corona Assembly

1) Loosen the three mounting screws that hold the block (front) in place; move the block (front) in the direction of the arrow (Figure 4-516), and fix it in place temporarily.



① Mounting screws

Figure 4-516

Note:
When forming a loop, wind the wire around a hex key once; then, turn the hex key four to five times, and then twist the wire.

2) Free a length of corona wire (0.1-mm dia.) from its reel, and form a loop at its end 2 mm in diameter.
3) Cut the end (excess) of the wire to 1 mm or less using a nipper or cutter.
4) Hook the loop on the stud shown in Figure 4-517, and route the wire in the order given in the figure.
5) Check that the wire has been strung 16 runs; then, wind the end of the wire on the fixing screw to fix it in place.
6) Cut the end (excess) to 1 mm or less using a nipper.
7) Loosen the screw tightened temporarily in step 1), and move the block into the opposite direction of the arrow (Figure 4-516); then, adjust the tension of the grid.
8) Dry wipe the grid wire.
9) Make sure of the following:
   - The grid wire is free of breaks and twists, and its gold-plating has not peeled.
   - The runs of the wire are at even intervals, i.e., the wire is in the groove of the block.

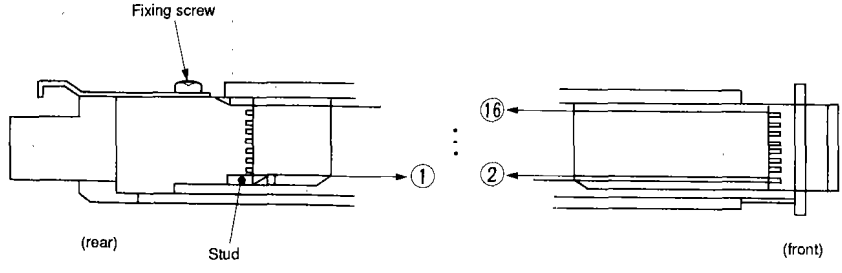


Figure 4-517

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6. Routing the Gut Wire for the Transfer/Separation Corona Assembly

Note:
Do not pull on the gut wire with force; after routing the wire, measure the opening of the corona assembly, and make sure that its center is not narrower than its both ends by 0.5 mm or more.

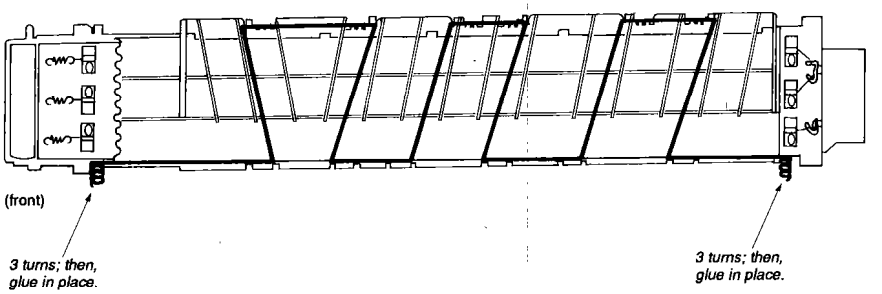

Figure 4-518

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7. Adjusting the Height of the Corona Wire

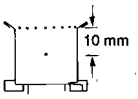
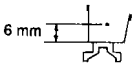
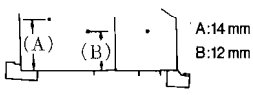
Corona assembly	Standard	Tolerance
Primary	Value on label  (10 mm from the center grid wire)	±3 mm
Pre-transfer	 (no height adjusting mechanism)	—
Transfer	Value on label 	
Separation	 (no height adjusting mechanism)	

Figure 4-519

a. The height (position) of the primary and transfer corona wire can be adjusted by turning the screw found behind the respective corona assembly; a full turn of the screw moves the corona wire by about 0.7 mm.

b. The values shown in Figure 4-519 are standards; and measurements taken at the factory for each machine are recorded on the label attached to the drum unit. Use the values recorded on the label when making the above adjustments.

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C. Separation Claw Assembly

1. Construction

The separation claw moves back and forth over a length of 16 mm across the photosensitive drum; it makes a single round trip for each 75 copies (approx.; A4/LTR, non-continuous).

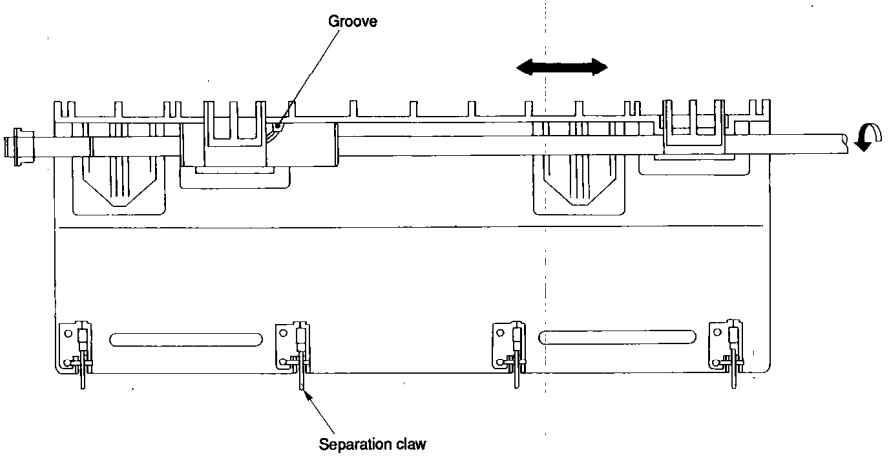
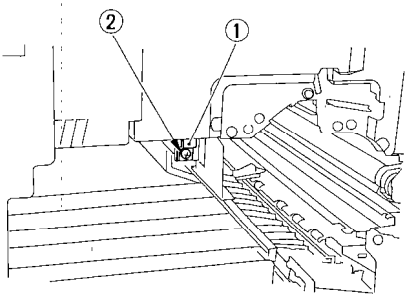


Figure 4-520

2. Detaching the Separation Claw

1) Open the front door.
2) Detach the drum unit.
3) Remove the screw, and detach the separation claw shaft stop.
4) Push the bushing to the rear, and detach the separation claw assembly.

Note:
Take care not to bring the tip of the separation claw into contact with the belt; be careful not to damage the separation claw after it has been detached. Exercise caution when handing the separation claws; they are extremly sharp.



① Separation claw shaft stop ② Screw

Figure 4-521

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VI. DEVELOPING SYSTEM

A. Black Developing Assembly

1. Construction

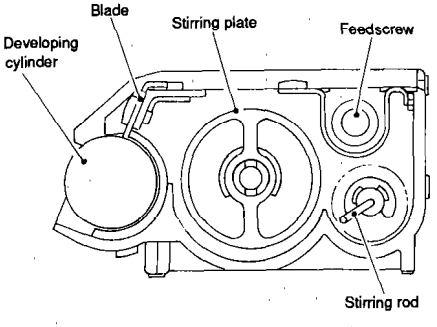
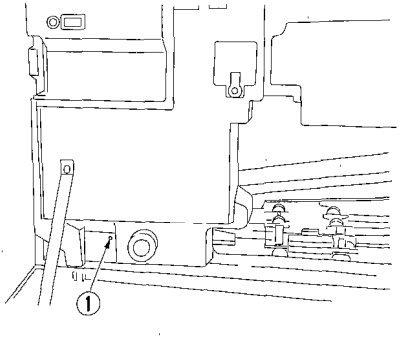


Figure 4-600

2. Detaching the Black Developing Assembly

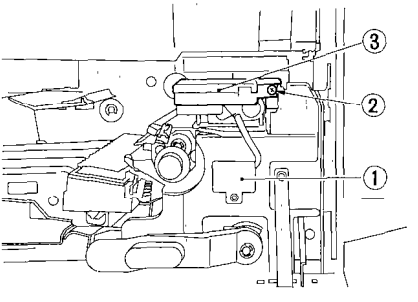
1) Open the front door.
2) Insert the door switch actuator into the door switch.
3) Push the service mode switch using a hex key.



① *Press with a hex key.*

Figure 4-601

4) Select 'DEV-REL' (✳4✳).
5) Press the OK key; the main motor rotates to release the black developing assembly.
6) Remove the door switch actuator.
7) Shift the feeder assembly release lever.
8) Detach the connector cover.
9) Disconnect the connector (J26; 3-pin) from the black developing assembly and the screw.



① Connector cover
② Screw
③ Black developing assembly

Figure 4-602

10) Slide out the black developing assembly slowly to the front; hold it on its bottom, and detach it.

Note:
Do not hold the developing assembly as if to hold the developing cylinder from its both ends; otherwise, toner may become fused.

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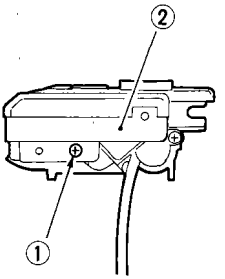
3. Detaching the Blade and the Developing Cylinder

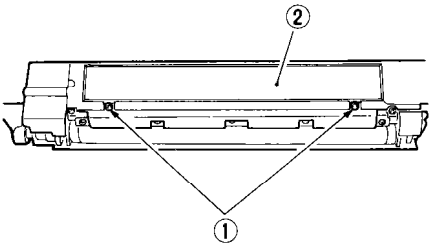
1) Detach the developing assembly from the copier.
2) Remove the self-tapping screw, and disengage the grip.



① Self-tapping screw ② Grip

Figure 4-603

3) Remove the two non-magnetic screws, and detach the developing cover.

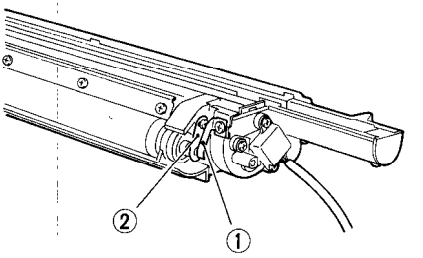


① Non-magnetic screws ② Developing cover

Figure 4-604

4) Pour out the toner on waste paper (newspaper).

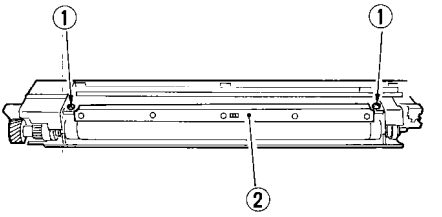
5) Remove the screw, and detach the electrode plate at the front.
6) Remove the self-tapping screw, and detach the magnetic fixing plate.



① Electrode plate (front) ② Magnetic fixing plate

Figure 4-605

7) Remove the two non-magnetic screws, and detach the blade together with its mount.



① Non-magnetic screws ② Blade

Figure 4-606

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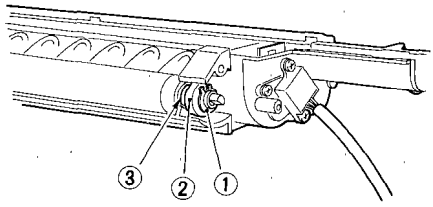
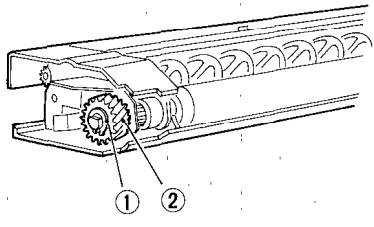
8) Remove the grip ring at the front, and detach the developing roll and the ball bearing.



① Grip ring ③ Ball bearing
② Developing roll

Figure 4-607

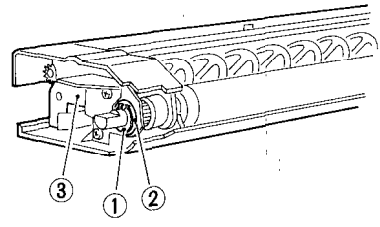
9) Remove the grip ring at the rear, and detach gear A.



① Grip ring ② Gear A

Figure 4-608

10) Remove the grip ring, and detach the washer and the bearing.
11) Remove the non-magnetic screw, and detach the gear unit.

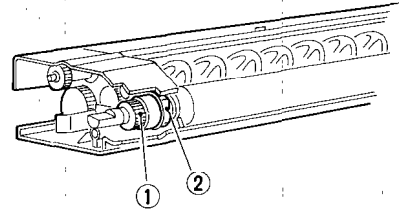


① Grip ring ③ Gear unit
② Bearing

Figure 4-609

12) Detach gear B (w/ pin) and the developing roll.

Note:
Take care not to drop the pin.



① Gear B ② Developing roll

Figure 4-610

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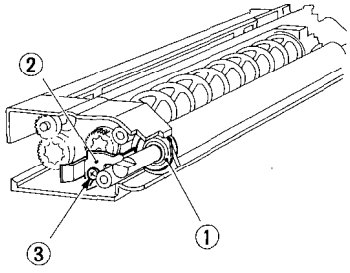
13) Remove the self-tapping screw, and detach the electrode plate (rear) together with the ball bearing.



① Ball bearing
② Electrode plate (rear)
③ Screw

Figure 4-611

14) Detach the developing cylinder.

4. Attaching the Developing Cylinder and the Blade

1) Attach the developing cylinder.

Note:
i. The developing cylinder has its own orientation; keep the longer shaft to the rear.
ii. Do not leave finger prints or oil on the surface of the developing cylinder; if necessary, dry wipe it using lint-free paper.

2) Attach the ball bearing together with the electrode plate at the rear; see Figure 4-613.

Note:
i. Do not use the screw at the time to fix the electrode plate in place.
ii. Rotate the electrode plate into the direction of the arrow in advance of step 4) to facilitate insertion of the blade mount ; see Figure 4-612.

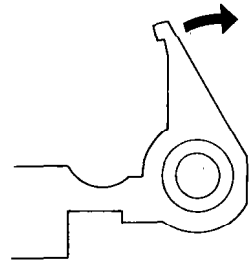


Figure 4-612

Note:
Make sure that the ball bearing (rear) is correctly positioned on the developing cylinder.

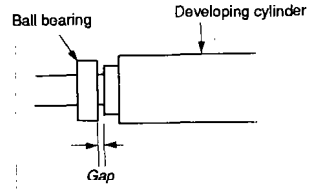


Figure 4-613

3) Attach the front ball bearing.
4) Attach the mount together with the blade to the container using two non-magnetic screws; see Figure 4-614.

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Note:
The blade is attached at the factory with high precision; do not separate it from its mount.

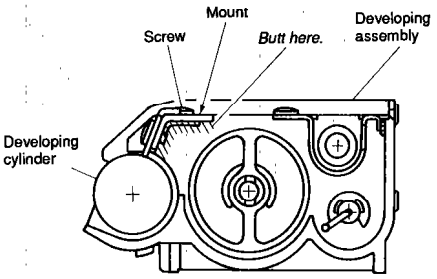

Figure 4-614

5) Turn the electrode plate at the rear in the direction of the arrow, and fix it in place using a self-tapping screw.

Note:
i. Make sure that the blade mount is in firm contact with the electrode plate.
ii. Make sure that the blade electrode has not ridden over the blade mount.
After attaching the blade to the developing assembly, be sure to check the gap from the developing cylinder; see p. 4-56.

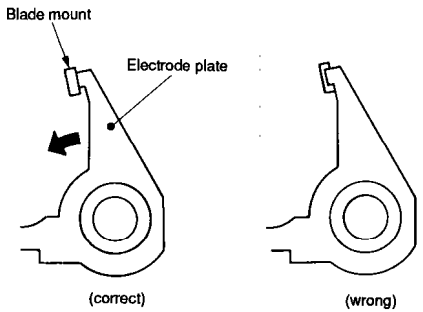

Figure 4-615

6) Attach the developing roll, the pin, and gear B at the rear; see Figure 4-610.
7) Attach the gear unit together with the bearing using a non-magnetic screw.
8) Fit two washers, and slide the grip all the way up to the groove in the shaft of the developing cylinder.
9) Attach gear A, and fix it in place using a grip ring.
10) Attach the developing roll at the front, and fix it in place using a grip ring.

Note:
Keep a gap of about 0.3 mm between the roll and the grip ring with the ball bearing (Figure 4-613) butted against the developing cylinder, and check to make sure that the roll rotates smoothly.

11) Attach the polarity plate at the front.
12) Push the polarity plate lightly in the direction of A, and then release it.
13) Push the polarity plate into the direction of A until line D on the plate faces notch C on the container.

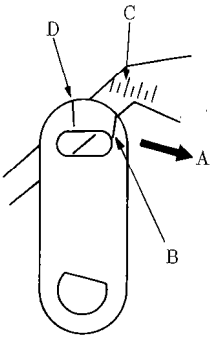

Figure 4-616

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14) Attach the polarity plate at the front using a screw.

Note:
Make sure that the polarity plate is in firm contact with the shaft of the developing cylinder.

15) Put toner into the black developing assembly as for installation. (✳4✳ TONER_S)
16) Attach the developing cover using two non-magnetic screws; and attach the grip using a self-tapping screw.

Note:
Do not leave fingerprints or oil on the surface of the developing cylinder; if necessary, dry wipe it using lint-free paper. If the image on the copy corresponding to the area which has been dry wiped tends to be too light, replace the developing cylinder. Do not use solvent.

5. Developing Blade Mount/Adjustment Procedure

Note:
i. If possible, avoid removing the developing blade as a single part. Instead, remove or mount together with the support plate.
(When mounting the blade together with the support plate, perform operations from step 6) of the adjustment procedure.)
ii. Mounting of the developing blade must be performed after cleaning the developing cylinder.
iii. Since the developing cylinder is easily damaged, pay extra attention when inserting or withdrawing the gap gauge.
iv. If the gap gauge is damaged or broken, replace it with a new one.
v. If the reference face of the gap gauge becomes stained with oils from your hand, the developing blade may also become stained during adjustment; therefore, do not touch the gauge with your fingers.

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1) Temporarily secure the developing blade to the support plate using the screws. At this time, the boss of the support plate must be in the hole of the developing blade.

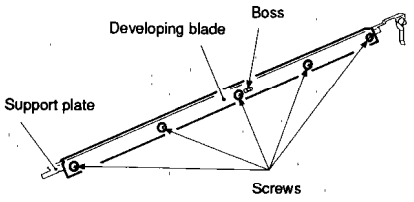

Figure 4-616a

2) As shown in Figure 4-616b, pinch the OK side of the gap gauges between the developing blade and developing cylinder (3 locations), and use the two screws to secure the developing blade to the developing assembly together with the support plate. (At this time, be careful not to strike the developing blade against the developing cylinder.)

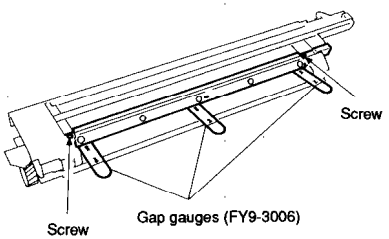

Figure 4-616b

3) While lightly pressing on the developing blade, fix it with the two screws as shown in Figure 4-616c. (Note that if the developing blade is pressed heavily, the developing cylinder may become damaged when the gap gauges are pulled out.)

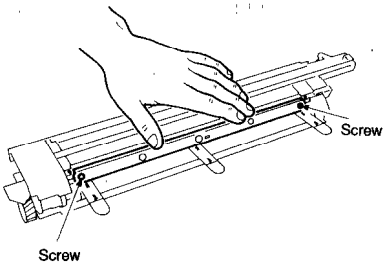

Figure 4-616c

4) Turn the eccentric boss shown in Figure 4-616d until the developing blade slightly touches the gap gauge, and secure it with the center screw.
5) Secure the remaining two screws and gently pull the gap gauges out. At this time, repeat from step 3) if the gauge is extracted with difficulty.

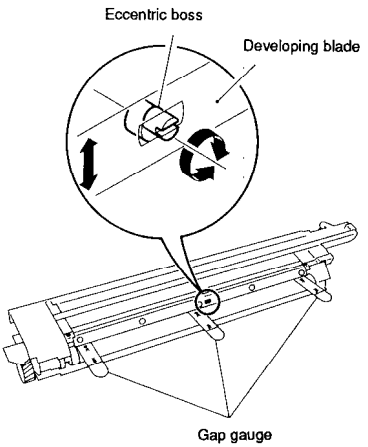

Figure 4-616d

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6) Check that the OK side of the gap gauge can be inserted smoothly and also that the NG side can not be inserted at the three locations where the gap gauges were pinched.
7) If the OK side of the gap gauge gets caught or the NG side allows free passage, loosen the screw at that location to readjust.
8) Repeat step 6) and 7) until the gap between the developing blade and the developing cylinder is optimum.

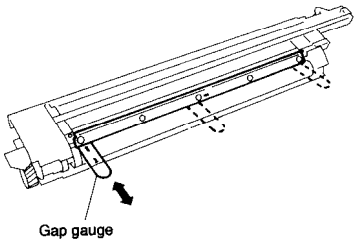

Figure 4-616e

B. CD Unit

1. Construction

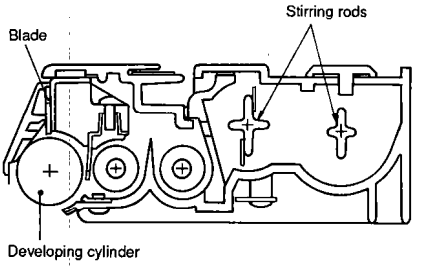

Figure 4-617

2. Replacing the Developing Cylinder and the Seal

- Do not touch or scratch the surface of the developing cylinder.
- Keep starter and toner ready in addition to the tool.

1) Place the CD unit on waste paper (newspaper).
2) Detach the hopper cover, starter cover, sleeve cover, and front cover shown in Figure 4-618.

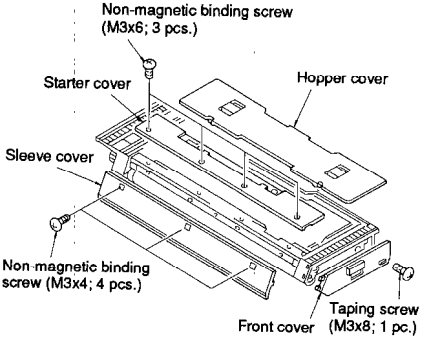

Figure 4-618

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3) Disconnect J852 (6-pin) from the PCB; then, loosen the PCB mounting screw (right), and detach left side.

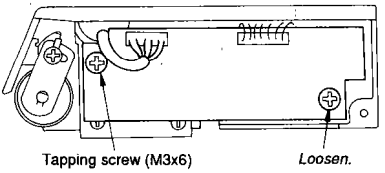

Figure 4-619

4) Remove the three screws shown in Figure 4-620, and detach the blade unit together with its mount.

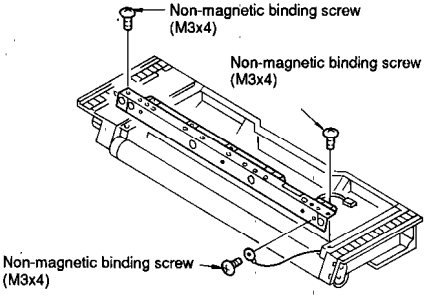

Figure 4-620

5) Empty the CD unit on waste paper (newspaper).

6) Remove the screw, and detach the grounding wire and the polarity orientation plate.

Note:
Take care not to rotate the polarity orientation plate.

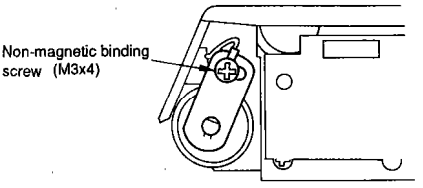

Figure 4-621

7) Remove the grip ring, and detach the roll and the bearing.

Note:
Make sure the roll rotates smoothly after attachment.

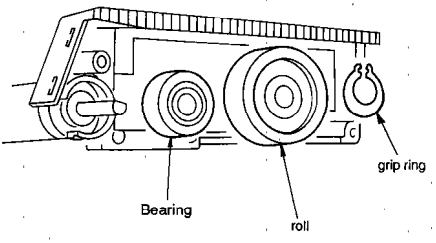

Figure 4-622

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8) Remove the two grip rings, and detach the too gears and the roll.

Note:
Make sure the roll rotates smoothly after attachment.

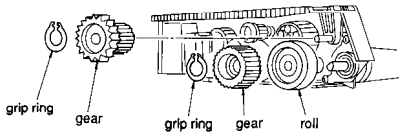

Figure 4-623

9) Remove the two screws, and detach the bias plate and the bearing.

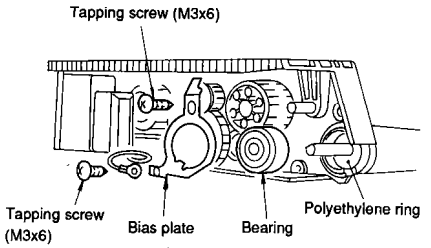

Figure 4-624

10) Hold the shaft at both ends of the developing cylinder, and detach the developing cylinder.

Note:
When inserting the cylinder into the holder, take care not to bend the polyethylene ring to be attached to the cylinder; see Figure 4-624.

11) Place the CD unit upside down on waste paper (newspaper), and tap its bottom lightly to empty it.
12) Remove the toner and the starter from the CD unit using a vacuum cleaner.
13) Clean the surface of the developing cylinder using alcohol solution.

Note:
If the seal is not to be replaced, skip steps 14) through 19).

14) Remove the seals (front, rear).
15) Clean the sections over which the seals were attached using alcohol solution.
16) Attach the new seals making sure that marks A and B are matched with the curvature (R) of the holder as in Figure 4-625; check that the angular hole of the seal holds the angular boss behind the holder.

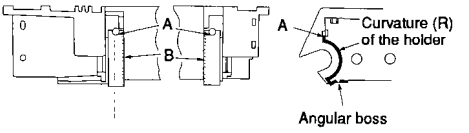

Figure 4-625

17) Hold the shaft of the developing cylinder, and force the developing cylinder against the seal to ensure firm contact.

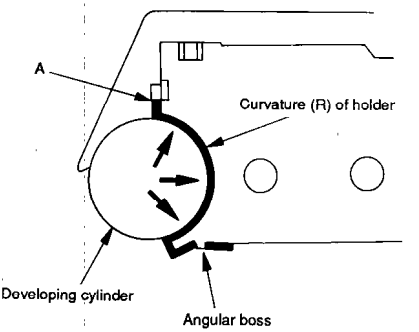

Figure 4-626

18) Attach the developing cylinder by reversing steps 7) through 10).
19) Fit the polarity orientation plate over the shaft of the developing cylinder.

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20) Push the polarity orientation plate into the direction of the arrow, and fix it in place using two screws.

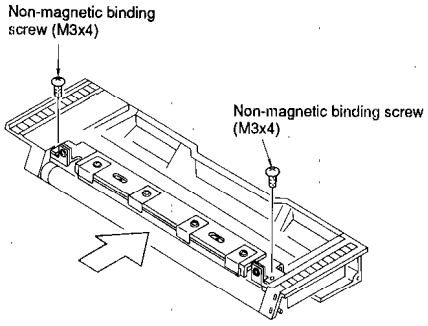

Figure 4-627

21) Move the polarity orientation plate left and right; be sure to feel a click.

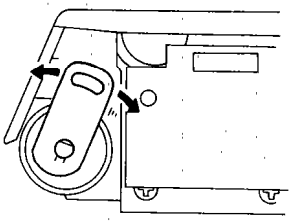

Figure 4-628

22) Push the polarity orientation plate with fingers, and fix it in place together with the grounding wire using a screw.

Note:
Hold only the flat portion of the plate.

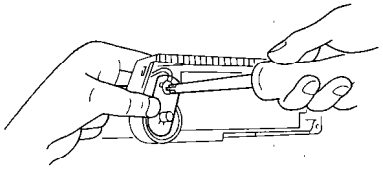

Figure 4-629

23) Remove the polarity orientation plate.
24) Loosen screws A (3 pcs.) of the blade unit removed in step 4); push the blade unit into the direction of the arrow, and fix it in position using screws B (2 pcs.).

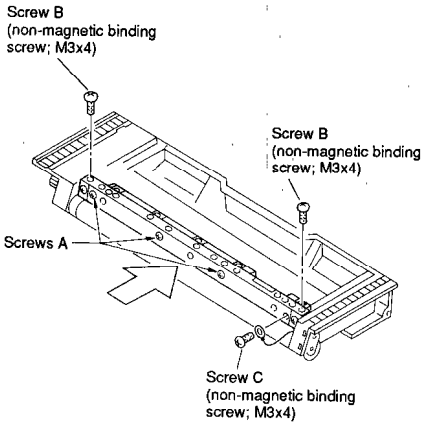
Screw B (non-magnetic binding screw; M3x4)
Screw B (non-magnetic binding screw; M3x4)
Screws A
Screw C (non-magnetic binding screw; M3x4)

Figure 4-630

25) Tighten screw C temporarily; while pushing the blade lightly against the cylinder, tighten screws A and screws C in order starting at the rear (Figure 4-630).
26) Make sure that the side spacer is in contact with the cylinder (Figure 4-631); further, make sure that an even gap is present between the blade and the cylinder.

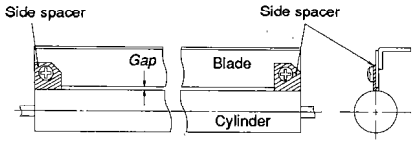

Figure 4-631

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27) Attach the hopper cover, sleeve cover, and front cover detached in step 2).

Note:
Do not attach the starter cover.

28) Install the CD unit using the CD UNIT INSTALLATION PROCEDURE with fresh starter.

2. Positioning the Color Toner Supply Solenoid (SL3)

Move the slide plate into the direction of A until it stops; in this condition, move the solenoid into the direction of A until it stops, and fix the solenoid in position.

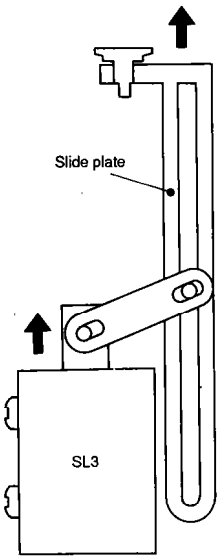

Figure 4-632

3. Positioning the CD Unit Connector

1) Detach the rear cover.
2) Remove the faston and disconnect the connector of the color toner supply solenoid (SL3).
3) Remove the two screws, and detach the CD unit connector assembly.

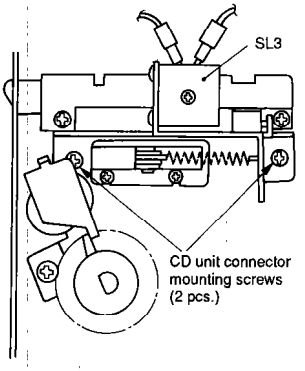

Figure 4-633 Rear View (upper left)

4) Measure dimensions A and B while pushing the mold portion shown in Figure 4-634. The dimensions must be more or less identical; otherwise, i.e., if there is a difference of 0.4 mm or more, re-tighten the adjusting screw to eliminate the difference. The nominal dimensions of A and B are 12.1 mm.

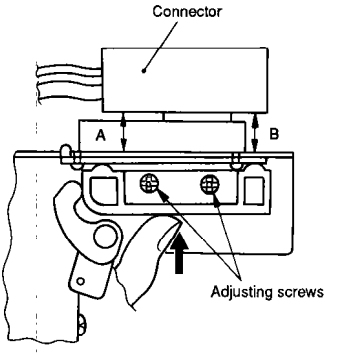

Figure 4-634

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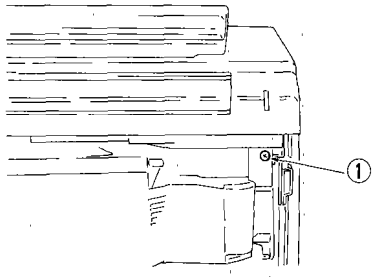
C. Hopper

1. Detaching the Hopper

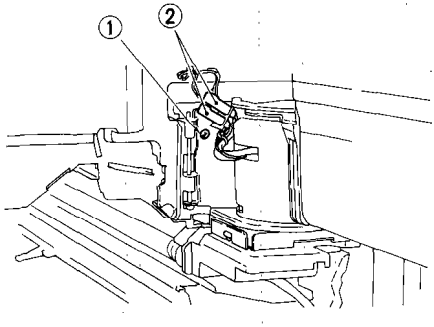
1) Open the front door.
2) Enter the service mode (*4*), and release the black developing assembly using 'DEL_REL'.
3) Detach the pre-transfer corona assembly and the drum unit.
4) Check that the hopper is closed, and remove the fixing screw.



① Screw

Figure 4-635

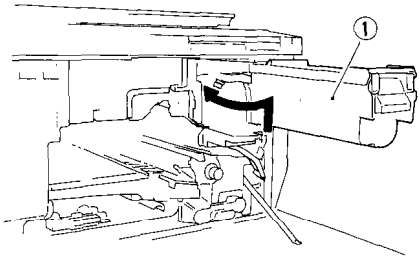
5) Open the hopper.
6) Remove the screw, and disconnect the two connectors.



① Screw ② Connectors

Figure 4-636

7) Lift the hopper (hinge), and swing it to the left.



① Hopper

Figure 4-637

Note:
Do not turn the rotary shutter shown in Figure 4-638.

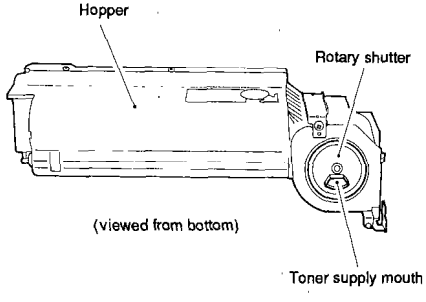


Figure 4-638

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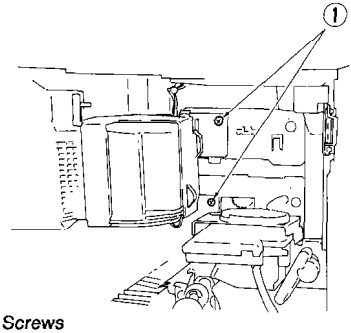
8) Remove the two screws, and detach the hopper. The hopper is likely to be heavy because of the toner inside it; support it when detaching.



① *Screws*

Figure 4-639

3. Points to Note When Attaching the Hopper

- Engage the hook on the hinge (Figure 4-640) on the front/rear plate.

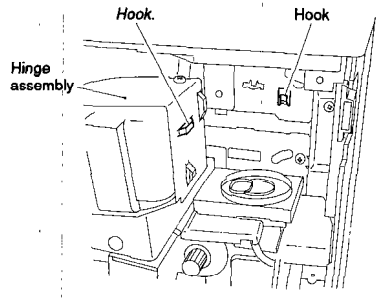


Figure 4-640

- *Make sure that the joint plate and the toner supply* mouth of the rotary shutter assembly match as shown in Figure 4-641.

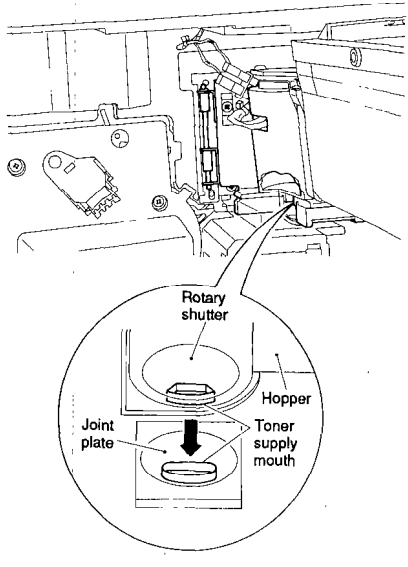


Figure 4-641

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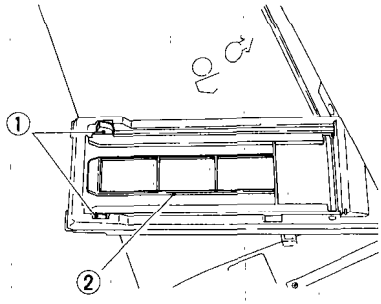
4. Opening the Hopper Cover

Press the latches to open the cover as shown in Figure 4-642.



① Latches ② Hopper cover

Figure 4-642 Top view

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VII. FIXING SYSTEM

A. Fixing Assembly

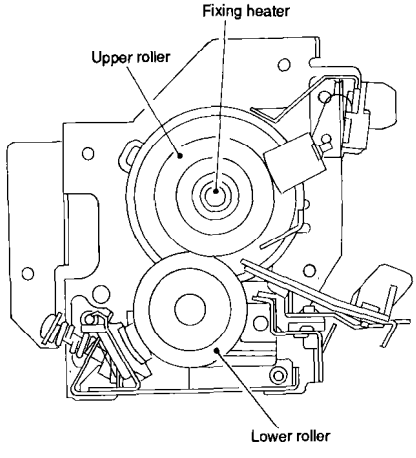


Figure 4-700 Cross Section (fixing assembly)

1. Engagement

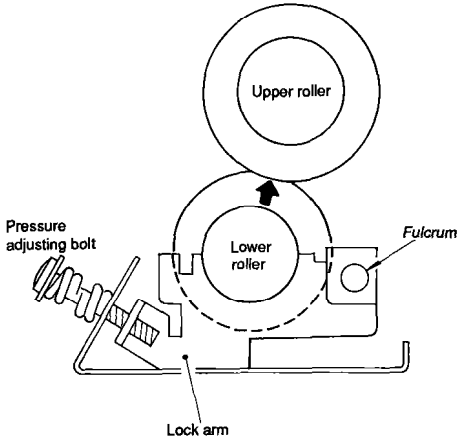


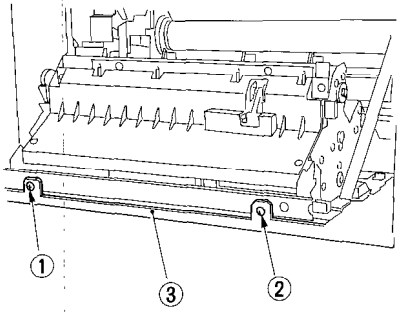
Figure 4-701

The position of the lock arm shown in Figure 4-701 can be adjusted by turning the pressure adjusting bolt found at the front and the rear of the fixing assembly.

A clockwise turn of the pressure adjusting bolt causes the lower roller to move in the direction of the arrow, thereby increasing the roller pressure.

2. Detaching the Fixing Assembly

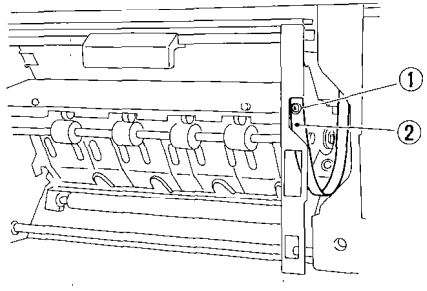
1) Open the front door.
2) Open the delivery assembly, and remove the two screws; then, detach the delivery cover.



① Screw ③ Delivery cover
② Stepped screw

Figure 4-702

3) Remove the screw, and remove the door tape of the delivery assembly.



① Screw ② Door tape

Figure 4-703

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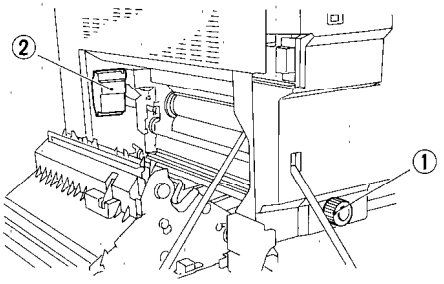
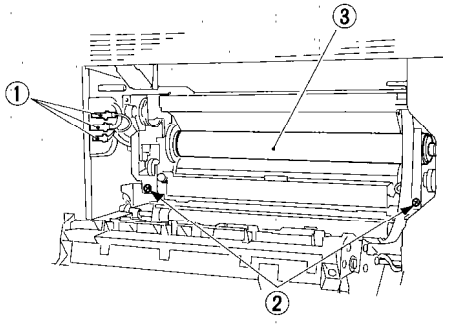
4) Remove the screw and the washer; then, detach the fixing assembly knob.
5) Remove the screw, and detach the connector cover.



① Fixing assembly knob ② Connector cover

Figure 4-704

6) Disconnect the three connectors (J60, 3-pin; J2, 2-pin; J84, 2-pin).
7) Remove the two screws, and slide out the fixing assembly.

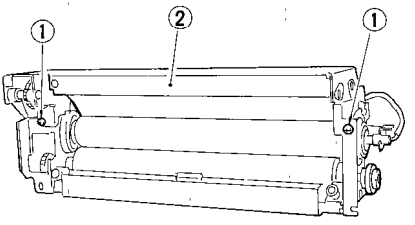


① Connectors ③ Fixing assembly
② Screws

Figure 4-705

3. Detaching the Heater, Upper Roller, and Lower Roller

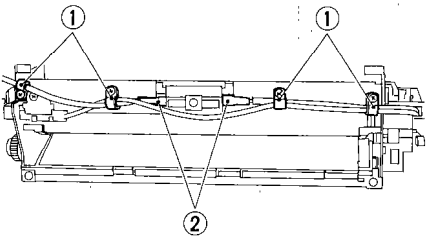
1) Detach the fixing assembly.
2) Remove the two screws, and detach the cleaning assembly.



① Screws ② Cleaning assembly

Figure 4-706

3) Detach the four harness retainers; 1 screw each.
4) Pull out the two fastons from the thermal switch.



① Harness retainers ② Fastons

Figure 4-707

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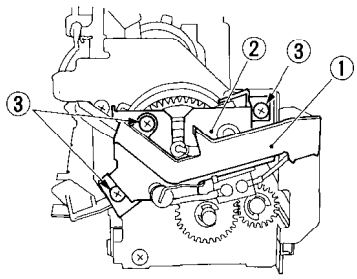
5) Remove the screw, and detach the harness guide.
6) Remove the two screws, and detach the heater fixing plate; then, pull out the heater.

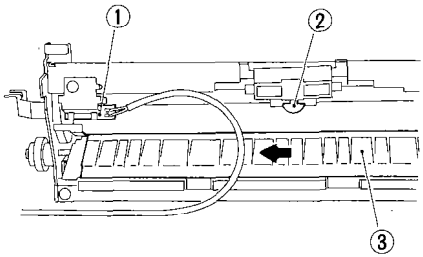
Note:
Make sure that the connector is at the front when attaching the heater.



① Harness guide ③ Screws
② Heater fixing plate

Figure 4-708 Rear

7) Remove the screw, and detach the thermistor and the thermoswitch.
8) Move the paper guide in the direction of the arrow to detach.

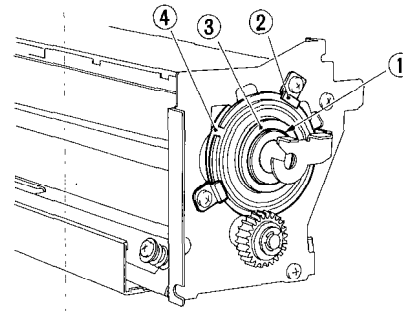


① Thermistor ③ Paper guide
② Thermoswitch

Figure 4-709

9) Remove the C-ring, and remove the two bearing retainers (1 scew each); then, detach the bearing together with the insulating bushing.

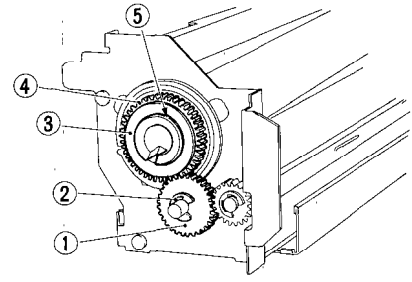
Note:
The insulating bushing is fragile; handle it with care.



① C-ring ③ Insulating bushing
② Bearing retainer ④ Bearing

Figure 4-710 Front

10) Remove the E-ring, and detach the gear at the rear; 1 grip ring.
11) Remove the C-ring, and detach the electrode plate and the roller shaft gear; 1 E-ring.



① Gear ④ Electrode plate
② Roller shaft gear ⑤ C-ring
③ E-ring

Figure 4-711 Rear

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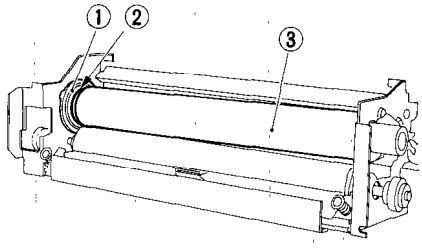
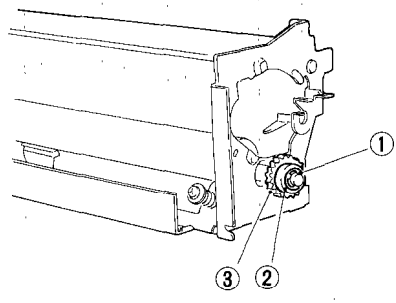
12) Detach the bushing at the rear and the insulating bushing, and pull out the upper roller while pushing it against the lower roller.



① Bushing
② Insulating bush
③ Upper roller

Figure 4-712

13) Remove the E-ring from the lower roller, and remove the two collars and the gear (w/ pin).
14) Lift the lower roller from the bushing, and detach it.



① E-ring
② Collars
③ Gear

Figure 4-713

4 Attaching the Heater

- Take care not to touch the surface of the heater.
- Attach it so that the connector is at the rear.

5. Attaching the Upper Roller

Attach the upper roller so that the cut-out is at the rear.

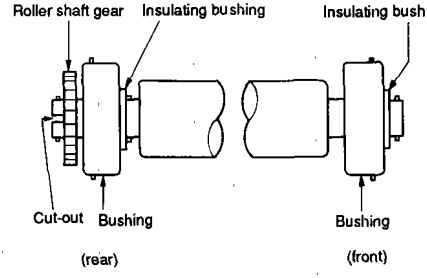


Figure 4-714

6. Attaching the Thermistor and the Thermoswitch

Make sure that the sensor faces of the thermistor and the thermoswitch are in even contact with the surface of the upper roller.

Note:
The position of the thermistor and the thermoswitch need not be adjusted; if the contact is not even, check to make sure that the leaf spring is not deformed.

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7. Measuring and Adjusting the Nip Width

a. Adjustment (adjusting the pressure adjusting bolt)

Check if the nip width is within the standards shown in Table 4-700; otherwise, adjust it using the bolt.

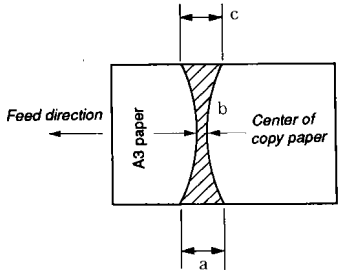

Figure 4-715

Note:
a and c represent points 10 mm from both sides.

Distance	Measurements*
b	5.3 ± 0.3 mm
| a – c |	0.5 mm or less

Table 4-700

* Take measurements when the upper and lower rollers are sufficiently heated.

b. Measurement

If the rollers are cold, wait about 15 min after wait-up; then, make 20 copies, and take measurements.

1) Lift the copyboard cover, and make a solid black copy (A3/11"×17").
2) Switch the machine OFF as soon as the leading edge of the copy paper comes out to the copy tray; then, open the front door and the delivery assembly.
3) Turn the fixing assembly knob slightly clockwise, and hold it for 15 sec; then, turn the knob farther to remove the copy paper.
4) Measure the width of the paper where the toner is shiny; see Figure 4-715.

8. Positioning the Paper Guide

The paper guide can be detached by pulling it to the front; the guide may be attached by reversing the steps for detachment. As a rule, the position of the paper guide need not be adjusted.

Note:
Do not detach the paper guide mount: the mount detemines the position of the paper guide.
If the position of the paper guide must be adjusted, detach the upper and lower fixing rollers, and move the paper guide mount so that the distance from the lower stay is about 40.8 mm as shown in Figure 4-716.

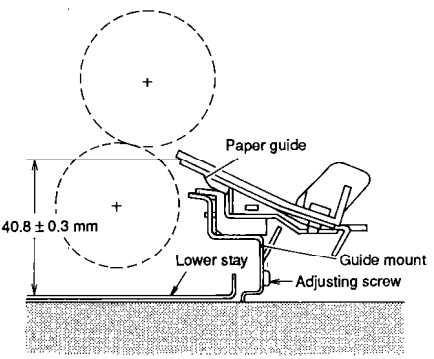

Figure 4-716

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9. Lubrication

Apply heat-resisting grease (CK-0427) over the following on a periodical basis:

- engagement of gears (rear)
- engagement of gears of fixing assembly knob (front)

10. Impregnating the Lower Fixing Roller Cleaner with Silicone Oil

If the felt used for the lower fixing roller cleaner must be replaced in the field, impregnate the new felt with oil to ensure good fixing.

a. Before Work

Make sure the following are available:

- Lower fixing roller cleaner (with new felt attached)
- Silicone oil (S-200; FY0-8202 or KF9-0400)

b. Impregnation

1) Impregnate the felt of the lower fixing roller cleaner with silicone oil (S-200; 6 cc); make sure the felt is soaked evenly.
2) Leave the cleaner alone for more than 24 hours at 25°C (approx.) before use.

Note:
Do not use the cleaner immediately after impregnation; otherwise, the oil would seep into the fixing roller, causing faulty fixing and in some cases, staining the copies.

B. Cleaning Assembly (fixing assembly)

1. Outline

The cleaning assembly is located at the top of the fixing assembly and serves to clean the upper roller by keeping a silicone-impregnated belt in contact with the upper roller.

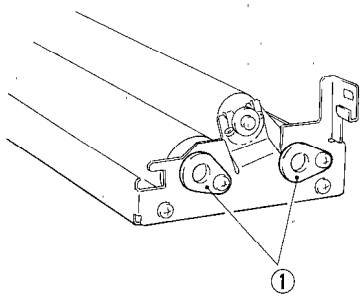
The belt is 15 m in length, and a red band is printed 2.5 m from its end.

Note:
Reset "WEB" in the counter mode (service mode) upon each replacement of the cleaning belt.

2. Disassembly and Assembly

a. Detaching the Cleaning Belt

1) Detach the fixing assembly.
2) Remove the two mounting screws, and detach the cleaning assembly; see Figure 4-706.
3) Remove the screws (1 pc. each), and detach the two bushings from the cleaning assembly; then, detach the cleaning belt.



① Bushings

Figure 4-717

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b. Attaching the Cleaning Belt

The service part for the cleaning belt consists of the feed shaft, take-up shaft, and belt, all constructed as a single entity.

Attach the cleaning belt by reversing the steps used for detaching it with the following in mind.

- Wind the belt around the take-up shaft two to three times; at the time, check that the section of the belt in contact with the roller is impregnated with oil.

Note:
Check that the belt is not askew and is free of slack or wrinkle.

c. Position of the Cleaning Belt Drive Solenoid (SL2)

Attach the solenoid so that the section shown in Figure 4-718 is 0.3±0.1 mm when the lever is moved in the direction of A.

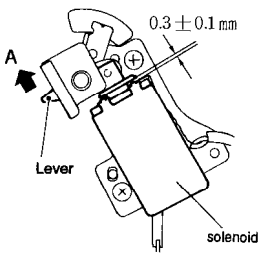

Figure 4-718

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VIII. ELECTRICAL

A. DC Controller

The DC controller is equipped with a built-in battery (BAT101); keep the following in mind, as shorting both terminals of the battery can cause overheating.

1. When Detaching the DC Controller

- Detach it together with the shield plate.

2. When Replacing the DC Controller

- When sending the DC controller for repair or relocation, keep it attached to the shield plate and protect it in a conductive bag. The conductive bag must be transparent on one side, so that the face of the controller shows through the bag.
- Perform the following if the DC controller PCB has been replaced.

1) Attach the new DC controller PCB.
2) Enter the setting (service mode; ✳3✳) shown on the label attached behind the front door. Remember to enter the version number of the image processor PCB in IP_PCB.
3) Select 'LASER' (service mode; ✳4✳), and press the OK key to adjust the laser warm-up time.
4) Set five A4 blank sheets of paper on the copyboard.
5) Select 'CCD_LAMP' (service mode; ✳4✳), and press the OK key; see the Image Adjustment Basic Procedure.
6) Press the RESET key.
7) Place the Test Sheet on the copyboard.
8) Make a test copy, and check the image.
9) Go througth the Image Adjustment Basic Procudure if the image is not satisfactory.

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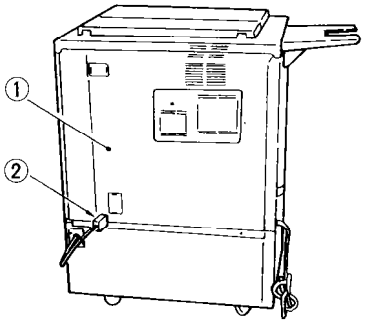
IX. CASSETTE FEEDING UNIT

A. Detaching the Copier from the Cassette Feeding Unit

1) Disconnect the copier's power plug.
2) Disconnect the cassette pedestal's connector from the copier.



① Rear cover ② Connector

Figure 4-901

3) Lift the copier using its four handles, and detach it from the cassette feeding unit.

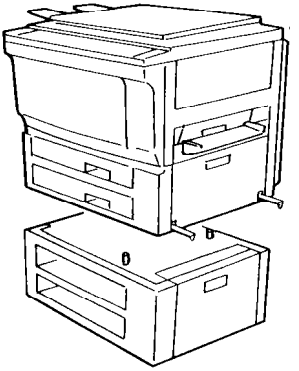


Figure 4-902

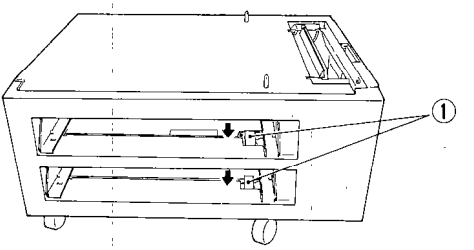
B. 3rd/4th Pick-Up Assembly

1. Detaching the 3rd/4th Pick-Up Assembly

1) Slide out the 3rd and 4th cassettes from the cassette pedestal.

Note:
Do not try to slide out the pick-up assembly with the cassette inside; otherwise, the lifter becomes trapped, preventing the detachment of both the pick-up assembly and the cassette.

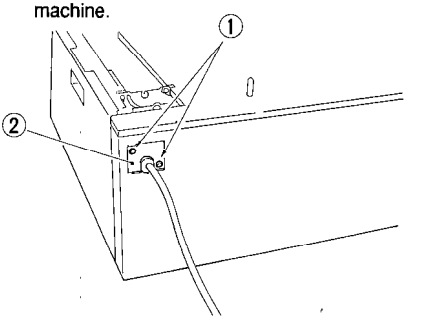
2) Push the lifter release arm into the direction of the arrow to lower the lifter.



① Lifter release arms

Figure 4-903

4) Disconnect the connector of the cassette feeding unit from the copier.
5) Remove the two screws, and detach the connector mount; push the connectors inside the machine.



① Screws ② Connector mount

Figure 4-904

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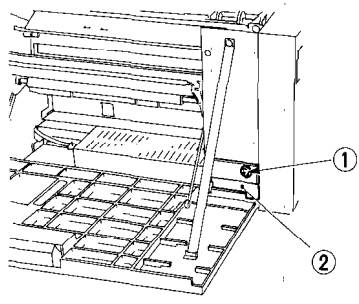
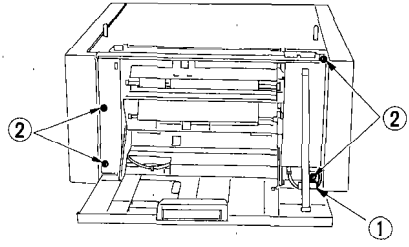
6) Open the lower right door, and detach the blanking plate.



① Screw ② Blanking plate

Figure 4-905

7) Disconnect the connector, and remove the four screws; then, detach the 3rd/4th pick-up assembly.



① Connector ② Screws (4 pcs.)

Figure 4-906

3. Detaching the 3rd and 4th Pick-Up Rollers

- Go through the steps given for the detachment of the 1st and the 2nd rollers of the copier's pick-up assembly; see III. "Feeder System."

4. Detaching the 3rd and 4th Separation/Feeder Rollers

- Go through the steps given for the detachment of the 1st and 2nd separation/feeder rollers; see III. "Feeder System."

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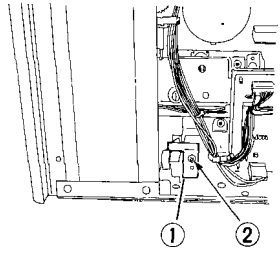
X. Paper Deck Pedestal

A. Detaching the Deck (left/right deck)

1) Remove the five screws, and detach the rear cover of the paper deck.
2) Remove the screw, and detach the deck stop plate.



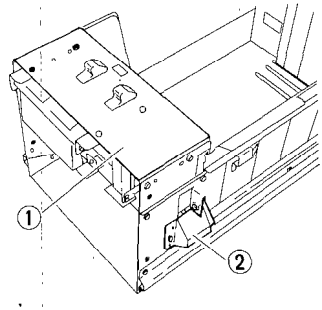
① Stop plate ② Screw

Figure 4-1000

3) Detach the deck unit from the paper deck.

B. Detaching the Lifter Cable (left/right deck)

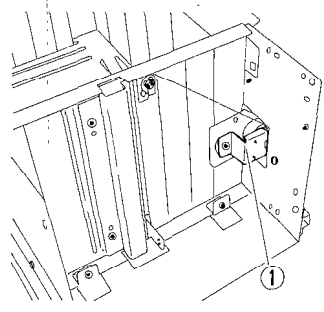
1) Detach the deck unit from the paper deck.
2) Remove the four screws, and detach the front cover.
3) Mark the position of the screw on the front upper stay; then remove the five screws, and detach the front upper stay and the gear cover.



① Front upper stay ② Gear cover

Figure 4-1001

4) Remove the screw, and detach the damper.



① Damper

Figure 4-1002

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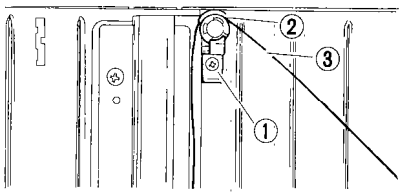
5) Remove the E-ring, and detach the gear, pin, and pulley cover.
6) Detach the cable end from the pulley.
7) Remove the metal stop from the cable relay mount; then, detach the pulley cover and detach the cable from the pulley.

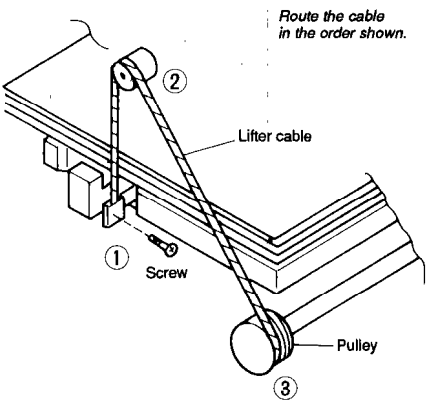


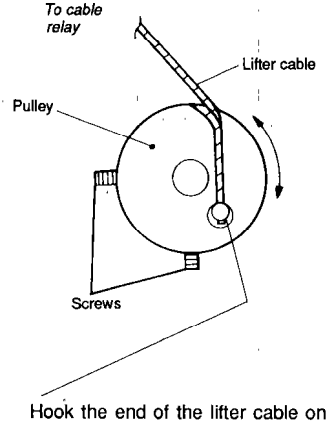
① Metal stop
② Pulley cover
③ Cable

Figure 4-1003

8) Remove the cable mounting screw from the lifter assembly.

Note:
Use the same steps to detach the rear cable. When routing the cable, make sure that the lifter is level over the front and the rear by adjusting the tension of the cable using the cable take-up pulley.





Hook the end of the lifter cable on the pulley cable hook; then, wind the cable around the pulley once.

Turn the pulley in the direction of the arrow so that the lifter is level (front, rear); then, fix the pulley to the shaft using two screws.

Figure 4-1004 Routing the Lifter Cable

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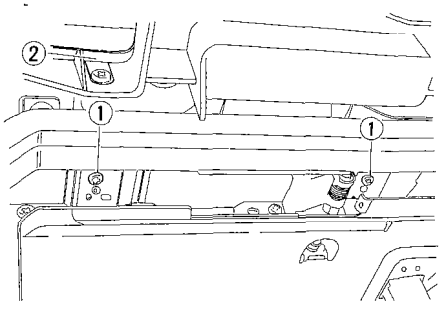
C. Detaching the Left Feeder Assembly

1) Detach the right deck.
2) Remove the two screws that hold the left feeder assembly in place.



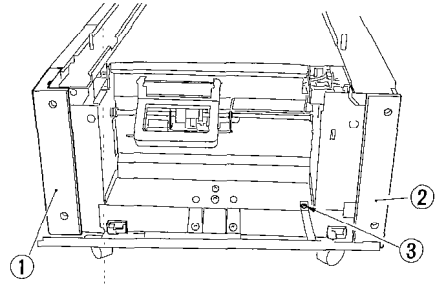
① Left feeder assembly stop screws ② Left feeder assembly

Figure 4-1005

3) Slide out the left feeder assembly to the front, and detach it from the paper deck.

D. Detaching the Right Pick-Up Unit

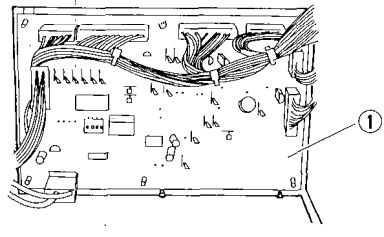
1) Detach the right deck from the paper deck.
2) Detach the left feeder assembly.
3) Detach the left deck from the paper deck.
4) Detach the front right cover and the rear right cover; then, remove the two right door belt stop screws.



① Front right cover ② Rear right cover ③ Right door belt stop screws

Figure 4-1006

5) Disconnect the seven connectors, and remove the two screws; then, detach the deck controller PCB.



① Deck controller PCB

Figure 4-1007

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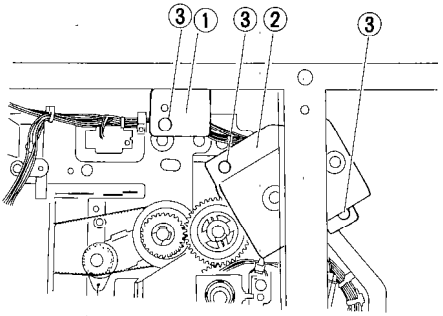
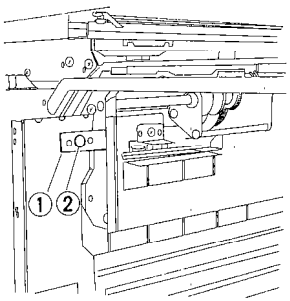
6) Remove the three screws, and detach the rear support plate and the left feeder shaft support plate.



① Rear support plate
② Left feeder shaft support plate
③ Screws

Figure 4-1008

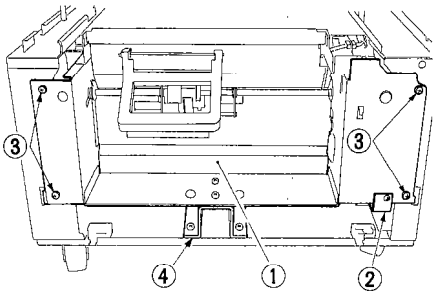
7) Remove the screw, and detach the front support plate.



① Front support plate ② Screw

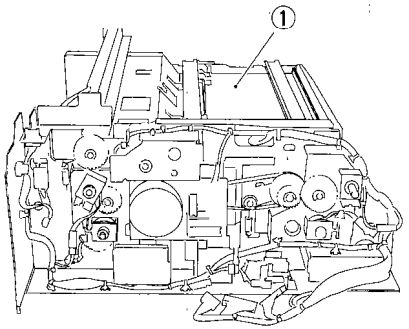
Figure 4-1009

8) Remove the screw, and detach the right pick-up stop plate.
9) Remove the support plate.
10) Remove the four unit fixing screws, and slide out the right pick-up unit.



① Right pick-up unit
② Right pick-up stop plate
③ Screws
④ Support plate

Figure 4-1010



① Right pick-up unit

Figure 4-1011

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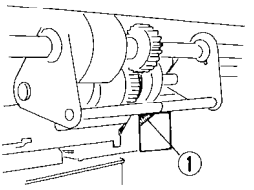
E. Detaching the Right Separation Roller

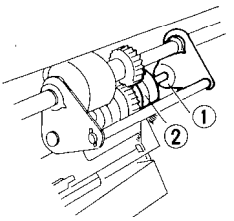
1) Open the right door.
2) Detach the shaft retainer spring.



① Shaft retainer spring

Figure 4-1012

3) Remove the two E-rings.



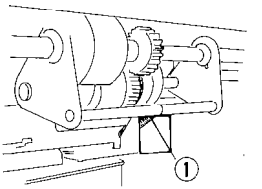
① E-ring ② Separation roller

Figure 4-1013

4) Detach the right separation roller together with its shaft.

F. Detaching the Left Separation Roller

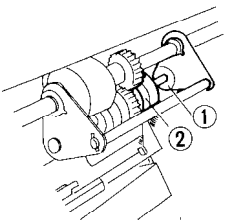
1) Detach the right pick-up unit.
2) Detach the shaft retainer spring.



① Shaft retainer spring

Figure 4-1014

3) Remove the two E-rings.



① E-ring ② Separation roller

Figure 4-1015

4) Detach the left separation roller together with its shaft.

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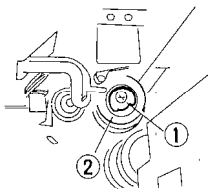
G. Detaching the Right Feeder Roller

1) Detach the right deck from the paper deck.
2) Remove the E-ring.
3) Slide out the right feeder roller to the front.



① E-ring ② Right feeder roller

Figure 4-1016

Note:
The feeder roller has its own orientation; attach it as shown in Figure 4-1017.

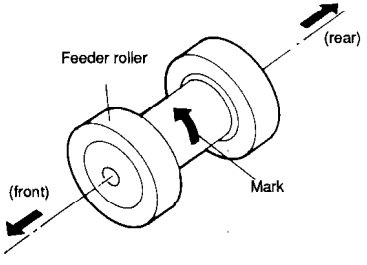
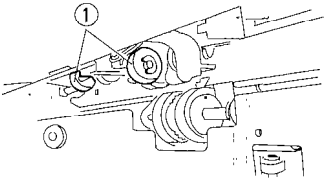


Figure 4-1017

H. Detaching the Right Pick-Up Roller

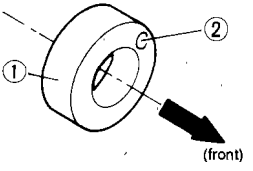
1) Detach the right deck from the paper deck.
2) Detach the pick-up roller from the collar.



① Pick-up roller

Figure 4-1018

The pick-up roller has its own orientation; attach it so that the mark on the roller is toward the front.



① Pick-up roller ② Mark

Figure 4-1019

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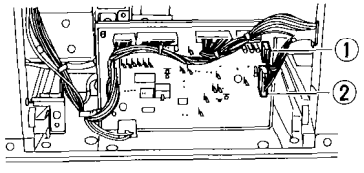
I. Detaching the Left Pick-Up Unit

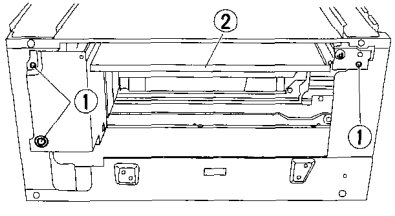
1) Detach the left deck from the paper deck.
2) Disconnect J707 and J708 from the deck controller.



① J707 ② J708

Figure 4-1020

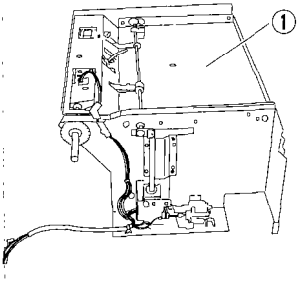
3) Remove the two screws, and detach the left feeder shaft support plate; see Figure 4-1008.
4) Remove the four screws, and detach the left cover.
5) Remove the three left pick-up unit fixing screws.



① Left pick-up unit fixing screws ② Left pick-up unit

Figure 4-1021

6) Slide out the left pick-up unit.



① Left pick-up unit

Figure 4-1022

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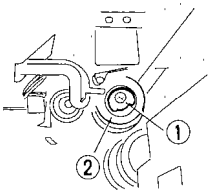
J. Detaching the Left Feeder Roller

1) Detach the left deck from the paper deck.
2) Remove the E-ring.
3) Slide out the left feeder roller to the front.



① E-ring ② Left feeder roller

Figure 4-1023

Note:
The feeder roller has its own orientation; attach it as shown in Figure 4-1024.

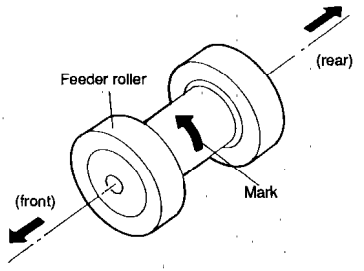
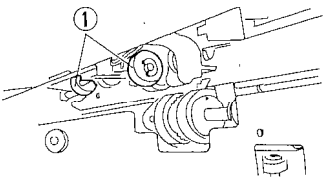


Figure 4-1024

K. Detaching the Left Pick-Up Roller

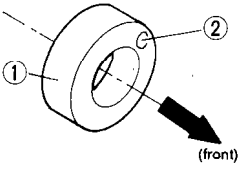
1) Detach the left deck from the paper deck.
2) Detach the pick-up roller from the collar.



① Pick-up rollers

Figure 4-1025

The pick-up roller has its own orientation; attach it so that the mark on the roller is toward the front.



① Pick-up roller ② Mark

Figure 4-1026

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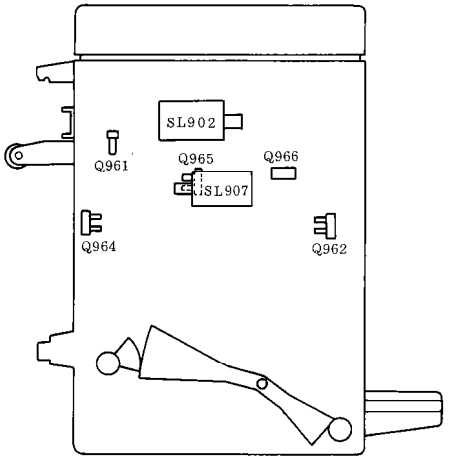
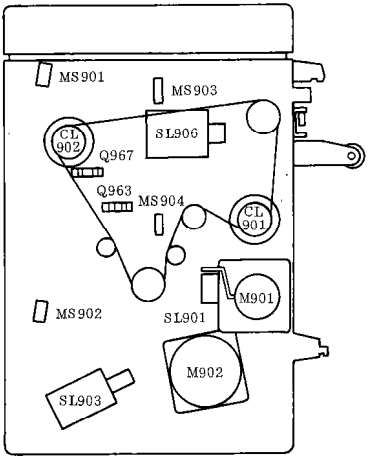
XI. CD UNIT CHANGER

A. Outline



Q961: CD unit horizontal home position sensor
Q962: CD unit horizontal drive sensor right
Q964: CD unit horizontal drive sensor left
Q965: CD unit feeder release sensor
Q966: CD unit claw release sensor
SL902: CD unit claw release solenoid
SL907: CD unit feeder release solenoid

Figure 4-1100 Front View



Q963: CD unit vertical drive home position
Q967: CD unit claw release sensor left
MS901: CD unit door sensor
MS902: manual feed door sensor
MS903: upper limiter
MS904: lower limiter
M901: vertical drive motor
M902: horizontal drive motor
SL901: vertical motor lock solenoid
SL903: manual feed switch solenoid
SL906: CD unit feeder solenoid
CL901: CD unit IN clutch
CL902: CD unit OUT clutch

Figure 4-1101 Rear View

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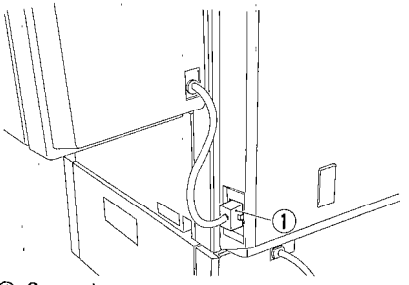
B. Detaching the CD Unit Changer from the Copier

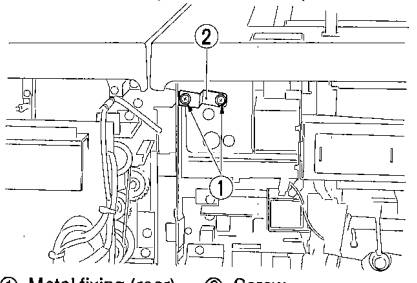
1) Disconnect the connector of the CD unit changer from the copier.



① Connector

Figure 4-1102

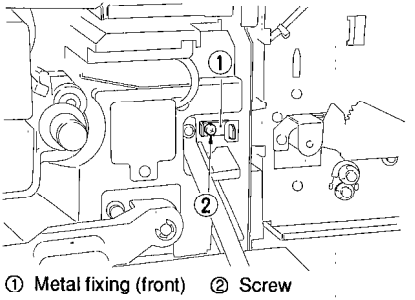
2) Detach the rear cover.
3) Remove the metal fixing (rear) from the hook found at the upper rear of the copier.



① Metal fixing (rear) ② Screw

Figure 4-1103

4) Open the front door.
5) Remove the metal fixing (front) from the hook found at the lower front of the copier.



① Metal fixing (front) ② Screw

Figure 4-1104

6) Hold the bottoms of the front and rear cover of the CD unit changer, and detach the changer.

■ Points to Note

① Be sure to hold the bottom of the covers (front, rear) when lifting the changer.
- Place the gear shaft of the CD unit changer on the copier's rail.
- Engage the hook of the CD unit changer on the end plate of the copier.

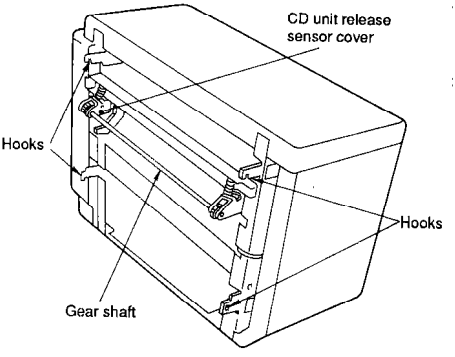


Figure 4-1105

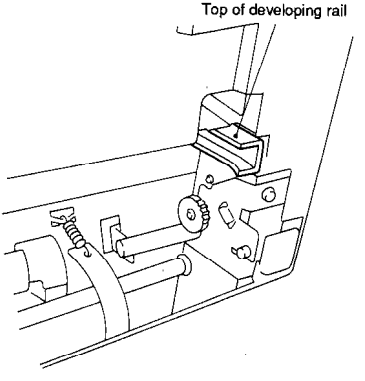


Figure 4-1106

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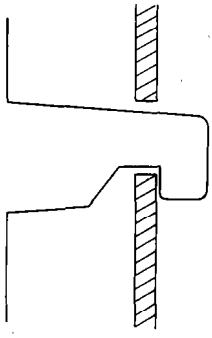
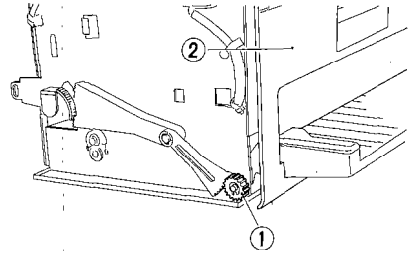


Figure 4-1107

C. Detaching the Manual Feed Assembly

1) Open the CD unit door and the manual feed door; then, detach the front cover (2 screws) and the rear cover (3 screws).
2) Remove the grip ring, and detach the gear.

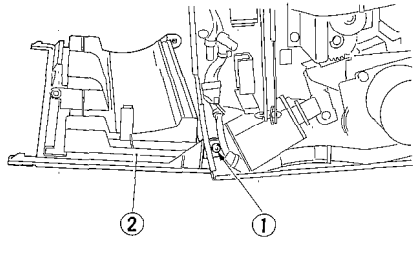
Note:
Make sure that the manual feed door is closed when attaching the gear.



① Gear ② Manual feed door

Figure 4-1108

3) Remove the stepped screw, and detach the manual feed door.



① Stepped screw ② Manual feed door

Figure 4-1109

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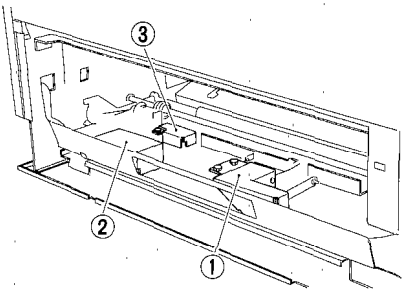
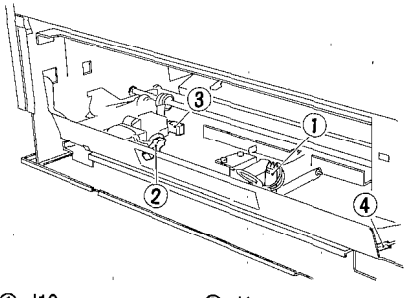
4) Detach the CD unit changer from the copier.
5) Detach the manual shutter solenoid cover (2 screws), manual feed skew roller solenoid cover (2 screws), and manual feed paper sensor cover (1 screw).



① Manual feed shutter solenoid cover
② Manual feed skew roller solenoid cover
③ manual feed paper sensor cover

Figure 4-1110

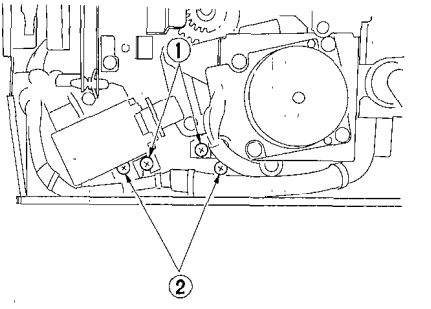
6) Disconnect J10 (2-pin), J9 (2-pin), and J1 (3-pin).
7) Detach the grounding wire.



① J10
② J9
③ J1
④ Grounding wire

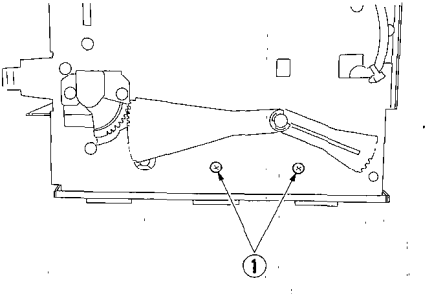
Figure 4-1111

8) Loosen two screws A shown in Figure 4-1112.
9) Remove four screws B, and slide out the manual feed assembly.



① Screws A ② Screws B

Figure 4-1112 Rear



② Screws B

Figure 4-1113 Front

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D. Adjusting the Compartment Stop Position

1) Detach all CD units from the CD unit changer.
2) Press the 'CD UNIT SELECT' key to select the first holder.
3) Press the 'CD UNIT OUT' key.
4) Check to see if dimension a in Figure 4-1114 is 0.5 to 1 mm; take measurements once each for front and rear.

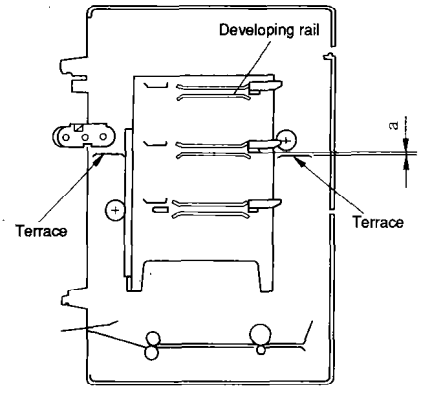

Figure 4-1114

• Checking Dimension a

Obtain a straight rod (5 mm thick, if possible); insert the rod in to the developing rail, and check the gap to the terrace using rulers (150 mm long, 0.5 mm thick). It is most desirable if one ruler slides in smoothly, and two rulers side in with a little force.

Note:
Be sure to remove the rod after the check; switching the machine ON without removing it can damage the CD unit changer.

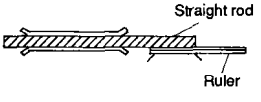

Figure 4-1115

5) Move the vertical home position sensor (Q963) to make adjustments if, after selecting the first holder, the dimensions as a whole are not correct while the height (front, rear) is correct. For example, if lower by about 0.5mm, move it up by 0.5 mm.

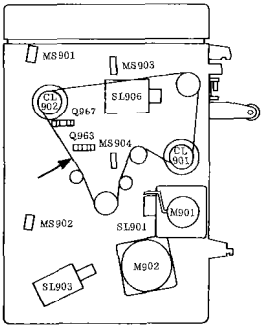

Figure 4-116

6) Slide out the compartment unit and reposition the rack if there is a discrepancy in the height. If the rear is higher than the front, loosen the screw on the front rack and move it up in the direction of the arrow; lower it if the front is higher than the rear.

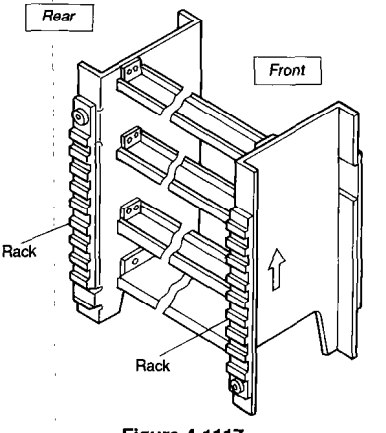

Figure 4-1117

7) Select the second and third holders, and make sure dimensions a in Figure 4-1114 is 0 to 1 mm.

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E. When Replacing the CD Unit Claw Release Sensors (Q966, Q967)

1) Replace the CD unit claw release sensor (Q966, Q967).
2) Select the 'CD UNIT SELECT' key to select the first holder.
3) Select the 'CD UNIT OUT' key.
4) Set the tester to the 12 VDC range.
5) Connect the probes of the tester to J905-9 (+) and J903-3 (-) on the CD unit changer controller PCB.
6) Check that the voltage is about 5V when Q966 or Q967 is blocked.
7) Detach the top plate of the CD unit.
8) Measure the distance between the top end of the end plate and the top end of the compartment frame; both front and rear. Call the measurement *dimension A*.

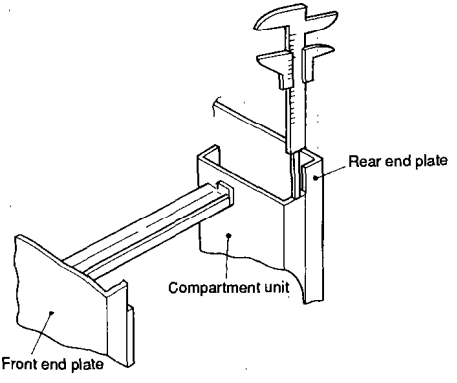

Figure 4-1118

9) Move the vertical drive motor by hand until the reading on the tester is '0V'.
10) Take measurements as in step 8) using a Vernier ruler; call the measurement *dimension B*.
11) Compare dimensions A and B to make sure that the following is true:
    $|A - B| \leq 2.0$ to 3.0 mm
12) Make checks for the second and third holders likewise; a total of 6 points, front and rear for each of the three holders, must be measured.

F. Adjusting the Feeder Gear

1) Press the 'CD UNIT SELECT' key to select the third holder.
2) Press the 'CD UNTI OUT' key.
3) Detach the top plate of the CD unit.
4) Push the vertical drive motor release solenoid; turn the rotar of the vertical drive motor by hand, and slide out the compartment from the CD unit changer.
5) Pull the feeder solenoid (SL906), and turn the adjusting screw so that the protrusion of the front feeder gear is 18.5 ±0.5 mm.

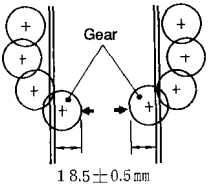

Figure 4-1119 Top View

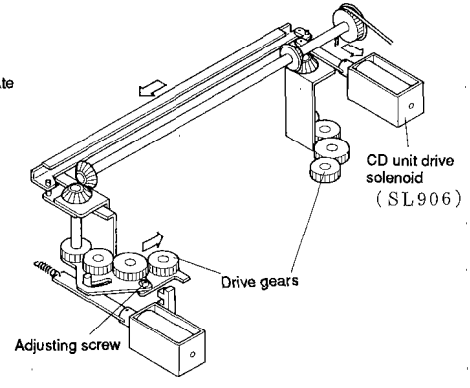

Figure 4-1120

6) Adjust the protrusion of the feeder gear at the rear.
7) Attach the compartment back to the CD unit changer after adjustment; at the time, make sure that the compartment is not tilted (front and rear; misengagement of a single tooth of the rack will result in a tilt of 2 to 3 mm between front and rear).
8) Check the stop position of the compartment.

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I. CHOOSING THE SITE

It is important to keep the following in mind; if possible, visit the user in advance.

- Make sure there is an exchusive outlet for the machine (rated voltage ±10%, 15A min.).
- Make sure that the site is kept between 15° and 30°C and its humidity is between 5% and 80%; avoid water faucets, water boilers, humidifiers, and refrigerators.
- Avoid open fires or areas subject to dust or ammonium gas; avoid direct sunlight* and install curtains if necessary.
  * *Exposure to direct sunlight can disrupt the auto paper selection and auto reproduction ratio selection mechanisms.*
- Make sure that the room is well ventilated.

Note:
The level of ozone generated by the copying machine is not likely to harm the health of those around it. The odor, however, may prove to be unpleasant to some if the machine is used in a badly ventilated room. Ventilate the room for work.

- Make sure that the machine's feet are in contact with the floor.
- Keep the machine at least 10 cm away from any wall, and provide space for access.

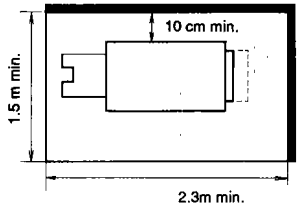

Figure 5-1

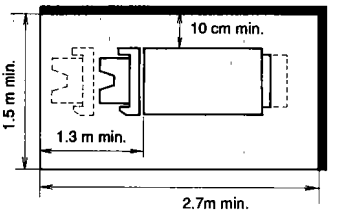

Figure 5-2 With Sorter

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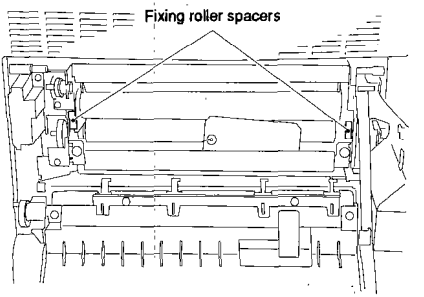
II. UNPACKING AND INSTALLATION

When a piece of metal is brought in from a cold place to a warm room, droplets of water can form on its surface. This phenomenon is called *condensation*, and copiers suffering from condensation may fail to produce images. If condensation is expected, leave the machine alone without unpacking for one hour or more and start the work after it has become fully used to the room conditions.

A. Unpacking

Step	Work	Checks/Remarks
1	Open the shipping box.	
2	Pull out the four handles from the machine, and lift the machine from the skid.	If the cassette pedestal is to be attached, place the copier on the pedestal. For installation of the cassette pedestal, see the CASSETTE PEDESTAL INSTALLATION PROCEDURE, which comes with the pedestal.
3	Open the cardboard box, and take out the parts and materials.	Make sure that the following are available: • Drum unit • CD unit • Copy tray • Cassette • OPERATOR'S MANUAL • Document tray • Screw (for document tray)
4	Open the front door and the delivery door, and detach the two fixing roller spacers.	
5	Close the front door and the delivery door.	

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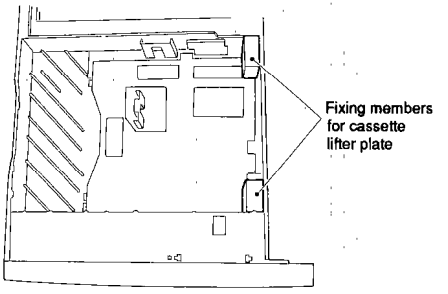
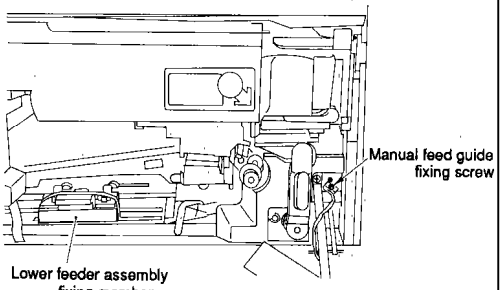
Step	Work	Checks/Remarks
6	Detach the cassette, and detach the fixing member from the cassette lifter plate. (Do not set the cassette as yet; keep it next to the machine.)	
7	Open the front door; then, detach the fixing member from the lower feeder assembly, and remove the fixing screw from the manual feed guide. **Note:** Put away the screw; it will not be used for the installation.	

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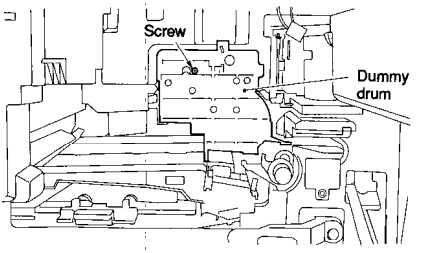
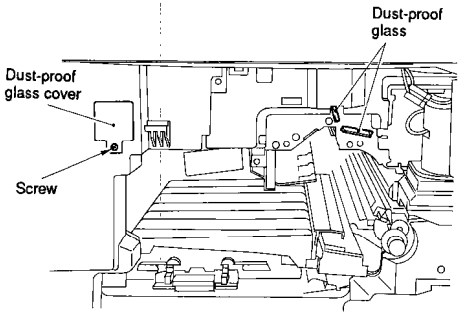
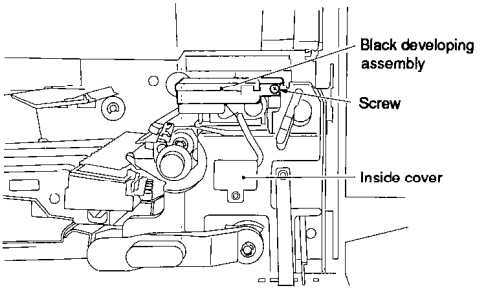
B. Installing the Drum Unit

Step	Work	Checks/Remarks
1	Open the hopper.	
2	Release the feeder assembly, and remove the mounting screw and the tape that holds the separation claw in place; then, detach the dummy drum. **Note:** Keep the screw; it will be used for installation of the drum unit.	
3	Remove the screw, and detach the dust-proof glass cover; clean the dust-proof glass inside and the two sheets of dust-proof glass on the front end plate using lint-free paper. Attach the dust-proof cover after cleaning.	
4	Detach the pre-transfer corona assembly, and clean the corona wire.	Do not attach the assembly yet.
5	Close the hopper, disconnect the connector behind the inside cover, and remove the mounting screw; then, detach the developing assembly. Check to make sure that the developing cylinder is free of damage.	
6	Take out the drum unit from its box while taking care not to damage its surface.	See the NOTES ON HANDLING THE DRUM UNIT, which comes with the drum unit.

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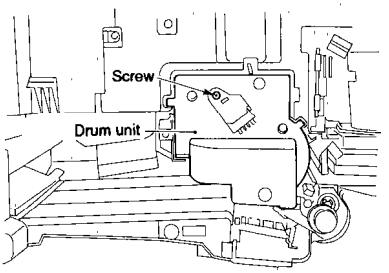
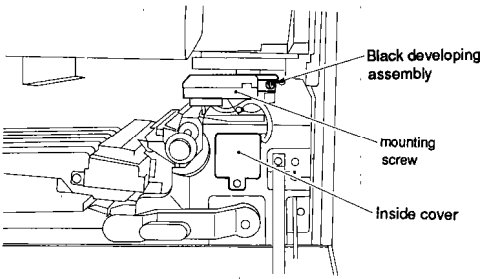
Step	Work	Checks/Remarks
7	Open the hopper, and insert the drum unit into the machine; then, fix the drum unit in place using the screw removed in step 2.	• The drum separation claw will be released automatically when the drum unit is inserted; do not touch the separation claw. • After installing the drum unit, make sure that the drum separation claw is in contact with the drum. 
8	Record necessary information on the label, and attach it on the front cover of the drum unit.	
9	Attach the black developing assembly to the copier, and fix it in place using a mounting screw; then, connect the connector. Attach the inside cover.	

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C. Starting the Machine, and Setting the User Mode

Step	Work	Checks/Remarks
1	Attach the pre-transfer corona assembly, and attach the feeder assembly.	
2	Connect the power plug into the power outlet.	
3	Insert the door switch actuator in to the door switch, and press the power switch to the 'I' position.	• Press the keys on the numeric keypad and the CLEAR key, and check that the copy count is indicated correctly. • Press other keys to make sure that they also operate correctly.
4	Wait until the WAIT indicator goesOFF; then, put black toner in to the hopper.	Do not pour the toner while the indicator is ON, or E020 will be indicated.
5	Make sure that the developing assembly is engaged properly before supplying the assembly with toner in step 7.	**Note:** Do not supply the developing assembly with toner without engaging the assembly; otherwise, the drive system of the hopper may suffer damage.
6	Close the hopper.	Be sure to close the hopper; otherwise, its drive mechanism may become damaged.
7	Press the service mode switch (SW501); select 'TONER_S' (service mode; [*] [4] [*]), and press the OK key to supply the developing assembly with toner.	The machine operates for about 7 min (max.) to supply the developing assembly with toner; steps 8 through 11 may be performed during this period. **Note:** Do NOT switch the machine OFF or remove the door switch actuator while the machine is operating.
8	Set the asterisk modes and 'USER OPTION' settings in the the service mode ([*] [5] [*]) to suit the needs of the user.	• Weekly Timer • Auto Clear Time • Time/Date
9	Set the cassette to the desired size by re-arranging the guide plate and tabs, and attach the size label.	See E. "Changing the Cassette Size."
10	Put paper into the cassette, and slide the cassette into the machine.	

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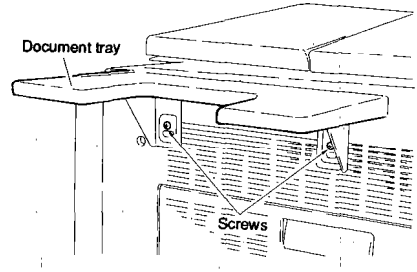
Step	Work	Checks/Remarks
11	Fix the document tray, and tighten the screws temporarily; position the document tray, and then tighten the screws fully.	
12	Attach the copy tray.	
13	Install the CD unit.	See the CD UNIT INSTALLATION PROCEDURE, which comes with the unit.

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D. Checking the Images and Operations

Step	Work	Checks/Remarks
1	Set the Test Sheet on the copyboard.	
2	Make a black copy; non-AE, copy density at 5, and DIRECT. Then, check the copy image.	If the background is foggy, make adjustments using 'LIGHT_BK' in the service mode (*3*).
3	Make a black copy; red elimination, non-AE, copy density at 5. Then, check the copy image.	If the background is foggy, make adjustments using 'LIGHT_R' in the service mode (*3*).
4	Place an A4 blank sheet of paper on the copyboard.	If possible, use Canon-recommended paper.
5	Select 'CCD_LAMP' in the service mode (*4*); then, press the OK key.	
6	Set the Test Sheet on the copyboard, and make a copy; then, check the copy image.	• Make sure that no abnormal noise is heard. • Check copy images for each fixed reproduction ratio. • Make sure that the copying operation is normal for different copy counts. • Mark a document using a red felt marker, and check to see that the area is identified correctly.
7	Make copies in the manual mode.	• Make sure that the copying operation is normal.
8	Remove the door switch actuator, and close the front door.	
9	Check to make sure that all covers are free of deformation and damage.	
10	Clean up the site.	
11	Move the machine to the installation site.	Make sure that the machine is more or less level.
12	Fill out the Service Sheet.	

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E. Changing the Cassette Size

Change the cassette size to suit the user's needs.

1) Slide out the cassette.
2) Relocate the tabs at the rear of the cassette as shown in the diagram.
3) Move the guide plate inside the cassette to suit the paper size; then, fix the guide temporarily.
4) Allow a gap of 1 to 2 mm between the paper and the guide plate, and fix the guide plate in place.
5) Replace the size label on the cassette.
6) Set the cassette.

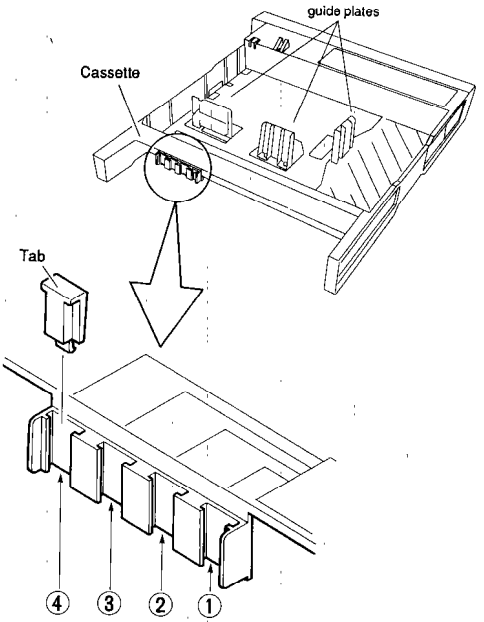

Figure 5-3

Copy Paper Size	Tab No.			
	④	③	②	①
B5	□			
U-L2		□		
A4	□	□		
B5-R			□	
B4	□		□	
A4-R		□	□	
A3	□	□	□	
U-S1				□
U-S2	□			□
U-L1		□		□
LTR	□	□		□
STMT			□	□
LGL	□		□	□
LTR-R		□	□	□
11x17	□	□	□	□

□ . . . . . tab present.

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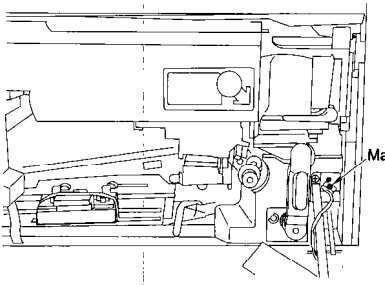
III. RELOCTING THE MACHINE

Go through the steps below before relocating the machine by truck or other means of transportation.

Step	Work	Checks	Remarks
1	Detach the drum unit.	Put the drum unit in its box for protection.	
2	Screw the manual feed guide in place.		
3	Attach the dummy drum.		
4	Tape the corona assemblies, feeder assembly release lever, and lower feeder assembly release lever to protect against vibration.		
5	Tape the front door and the delivery assembly cover in place.		
6	Place a single sheet of A3 (or 11" × 17")copy paper on the copyboard glass, and tape the copyboard cover in place.		

Note: If the truck is not equipped with a lifter, i.e., if the copier needs to be lifted, detach the copier from the cassette pedestal before doing so. (See CHAPTER 4.)

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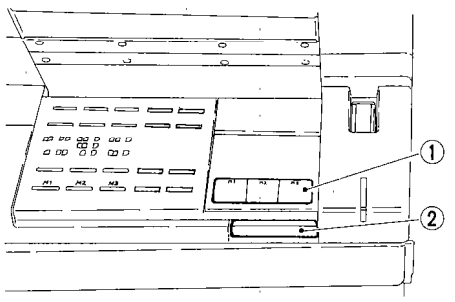
IV. ATTACHING CONTROL CARD V

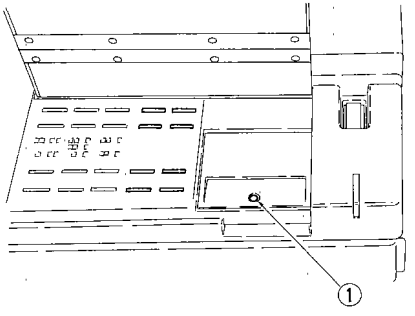
1) Open the front door, and detach the inside left cover.
2) Detach the control panel assembly; see p. 4-3.
3) Detach the blanking plate from the control card slit.
4) Detach the transparent MEMO sheet.



① Transparent MEMO sheet
② Blanking plate

Figure 5-4

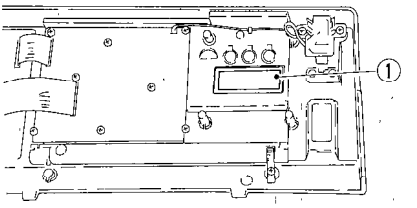
5) Remove the screw from the blanking cover.



① Screw

Figure 5-5

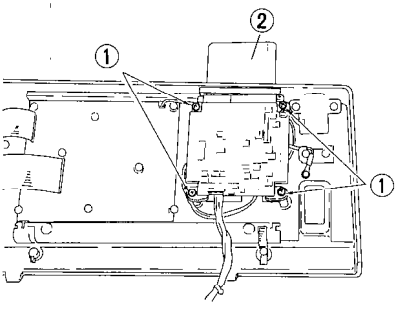
6) Turn over the control panel, and detach the blanking plate.
7) Detach the protection sheet from the transparent sheet.
8) Place the transparent sheet over the hole of the display.



① Transparent sheet

Figure 5-6

9) Detach the protection sheet from the display of Control Card V.
10) Fix Control Card V to the control panel using four mounting screws. Slide in and out a card into Control Card V; fix Control Card V at a point where the card may be slid in and out smoothly.



① Mounting screws ② Control card

Figure 5-7

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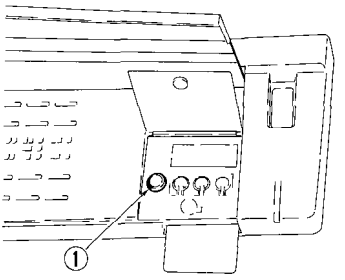
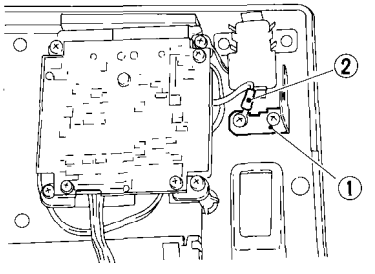
- Check that the connector for the printer is centered over the hole.



① Connector for printer

Figure 5-8

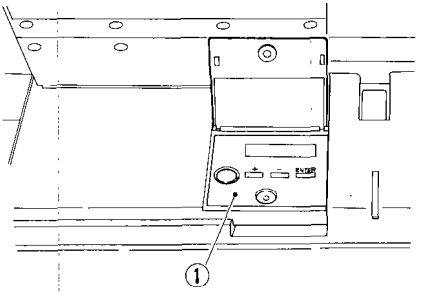
11) Fix the grounding wire of Control Card V to the metal fixing using the screw (M3×10) that comes with the unit.



① Metal fixing
② Grounding wire

Figure 5-9

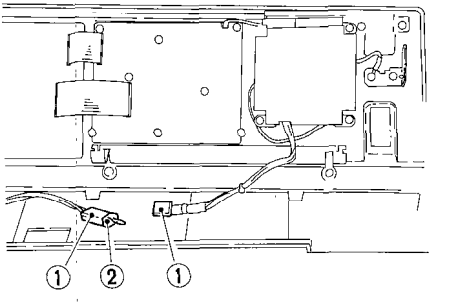
12) Detach the protection sheet from the operation guide of Control Card V.
13) Attach the operation guide of Control Card V to the copier's control panel.



① Operation guide

Figure 5-10

14) Attach the control panel to the copier.
15) Attach the transparent sheet removed in step 4).
16) Disconnect the shorting connector shown in Figure 5-11.
17) Connect the 4P connector of Control Card V and the 4P connector of the copier.



① 4P connector ② Shorting connector

Figure 5-11

18) Switch the copier ON, and check the operation of Control Card V.
19) Attach the inside right cover.

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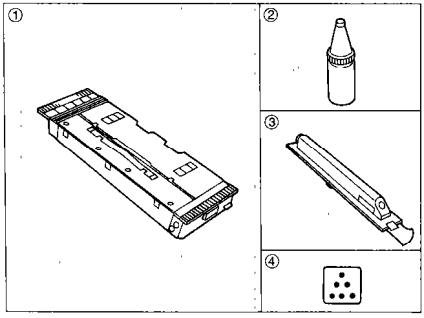
V. CD UNIT INSTALLATION PROCEDURE

Follow the steps herein when installing the CD unit to the copier.

1. Unpacking

Open the shipping boxes containing the CD unit, starter, and toner cartridge; then, make sure that none of the following is missing.



① CD unit ..... 1 unit
② Starter ..... 1 pc.
③ Toner cartridge ..... 2 pcs.
④ Color Toner label ..... 1 pc.

Figure 5-12

2. Supplying the Starter

1) Insert the door switch actuator into the door switch, and turn the power switch ON.

Note:
Skip steps 2) through 4) if the CD unit is used for red toner.

2) Remove the screw, and detach the CD unit's front cover.

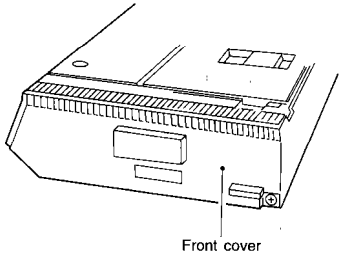


Figure 5-13

3) Cut the lead wires of the resistors (JP851, JP852) on the PCB to suit the color of the toner; then, detach the resistors.

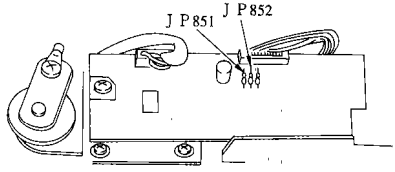


Figure 5-14

	JP851	JP852
red	—	—
bule	*Remove*	—
green	—	*Remove*
brown	*Remove*	*Remove*

Table 5-1

4) Attach the CD unit's front cover.
5) Attach the Color Toner label.
6) Remove the four screws, and detach the CD unit's top cover.

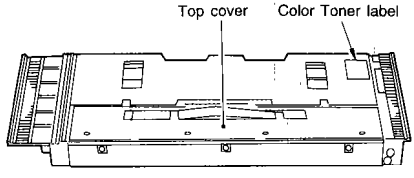


Figure 5-15

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7) Shake the starter bottle lightly up and down about ten times.
8) Turn the supply mouth of the starter bottle counterclockwise to detach it.

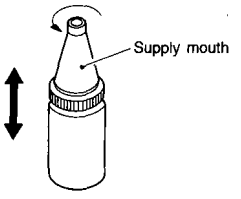

Figure 5-16

9) Remove the seal from the starter bottle.

Figure 5-17

10) Attach the supply mouth back on the stater bottle.
11) Pour the starter into the CD unit's developing cylinder evenly.

Note:
Do not spill the stater; if inadequate, fogging can occur.

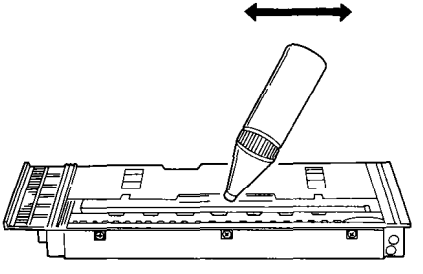

figure 5-18

12) Attach the CD unit's top cover.
13) Check that the copier is in its standby state; wait if it is in WMUP.

3. Installing the CD Unit to the Copier

a. Copier without CD Unit Changer

1) Open the CD unit door, and check if the copier has a CD unit; detach the CD unit if found.
2) Open the CD unit door, and place the CD unit flush against the grip.
3) Push in the grip, and close the CD unit door.

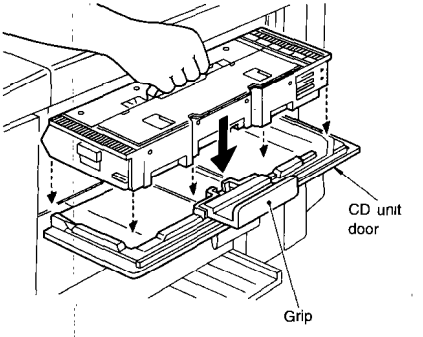

Figure 5-19

b. Copier with CD Unit Changer

1) Attach the CD unit sensor label* on the CD unit.
**Comes with the CD unit changer.*

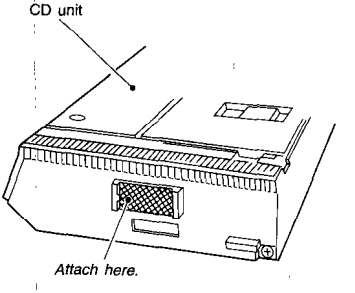

Figure 5-20

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Note:
Perform steps 2) through 4) if any of the following applies:
I. The copier has a CD unit inside it.
II. The CD unit changer has a CD unit containing toner of the same color.

2) Press the CD UNIT SELECT key on the control panel of the CD unit changer to select the CD unit to be removed.

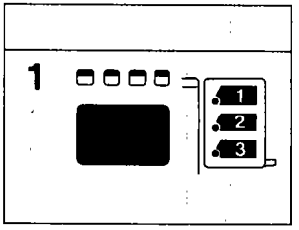

Figure 5-21

3) Press the CD UNIT OUT key, and wait until the indicator stops to flash and remains ON.

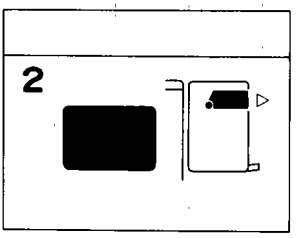

Figure 5-22

4) Open the CD unit door, and slide out the CD unit.
5) Select a holder without a CD unit; repeat steps 2) and 3).
6) Open the CD unit door, and place the CD unit flush against the grip.
7) Push the grip to close the door.

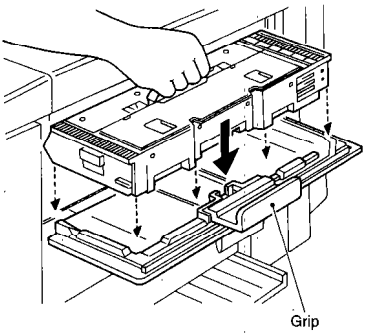

Figure 5-23

8) Press the copier's COLOR SELECT key to choose the color of the toner inside the CD unit being installed.
9) Press the COPY START key.
   • In response, the CD unit will be set inside the copier.

4. Adjusting the VR

1) Check that the hopper is closed; then, remove the fixing screw from the hopper assembly.

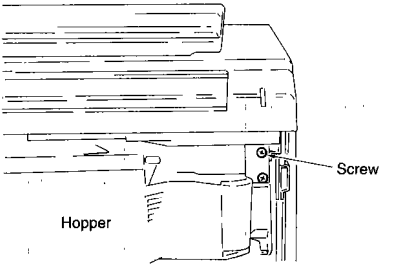

Figure 5-24

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2) Open the hopper.
3) Remove the screw.

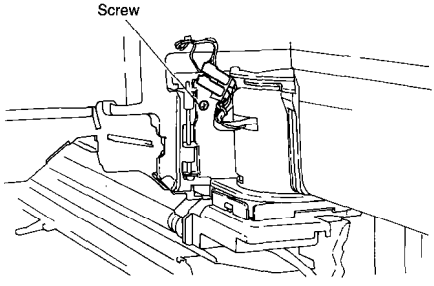

Figure 5-25

4) Lift the hopper assembly (hinge), and swing it to the left.

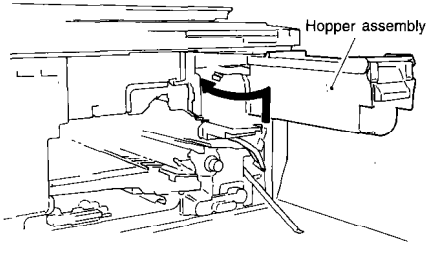

Fig. 5-26

5) Press the copier's service mode switch (SW501) using a hex key.
   - The copier enters the service mode and indicates '$' in the upper left corner of its message display.
6) Press the [*], [4], and [*] keys in sequence.
   - The copier enters the FUNCTION mode.
7) Press the [▽] key, and select 'CD-ROT'.
   - 'CD-ROT' is indicated.

Note:
i. When the OK key is pressed, the CD unit becomes engaged, and the main motor rotates for three minutes. Wait about 30 seconds after the main motor has started to rotate; then, perform step 9).
ii. The CD unit becomes disengaged automatically three minutes after the main motor starts to rotate; be sure to finish step 9) within the period.

8) Press the OK key.
9) Insert a flat-blade screwdriver into the hole in the front end plate, and turn the CD unit's VR851 (rough) until LED851 goes ON; thereafter, wait until the main motor stops rotating.

Note:
If the LED flashes, making adjustment difficult, turn VR852 (fine); if possible, keep VR852 centered, and use VR852 only.

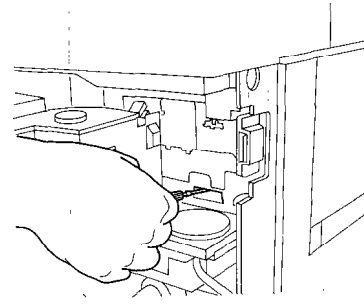

Figure 5-27

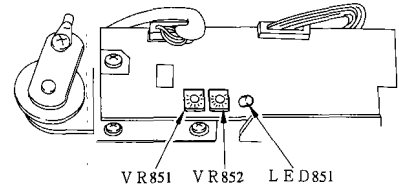

Figure 5-28

10) Check that the main motor has stopped rotating; then, press the RESET key twice to leave the service mode.
11) Attach the hopper.

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Points to Note When Installing the Hopper

- Engage the hook on the hinge assembly on the front end plate; Figure 5-29.

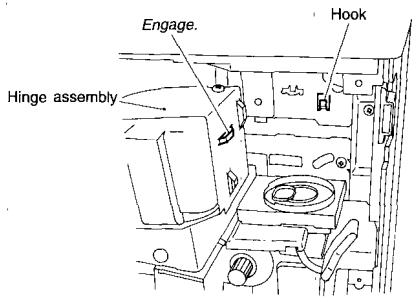

Figure 5-29

- Make sure that the joint plate and the toner supply mouth of the rotary shutter assembly match; Figure 5-30.

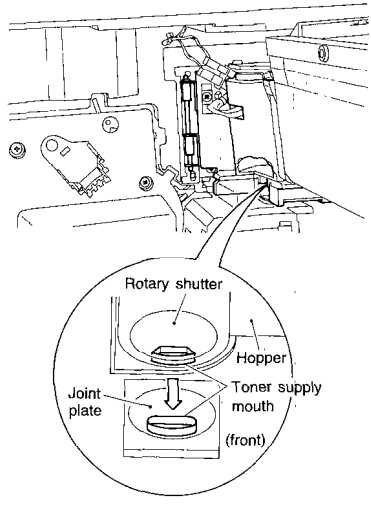

Figure 5-30

5. Supplying Toner

a. Copier without CD Unit Changer

1) Open the CD unit door, and slide out the CD unit.
2) Disengage the two locks, and open the CD unit's toner supply cover.
3) Shake the toner cartridge left and right several times to even out the toner.
4) Fit the toner cartridge in the CD unit.
5) Hold the toner cartridge, and pull the seal horizontally until the mark 'STOP' comes into view.
6) Tap on the top of the cartridge lightly.
7) Hold the CD unit; pick the cartridge, and detach the cartridge.
8) Close the toner supply cover, and engage the two locks.
9) Push the CD unit inside, and close the CD unit door.
10) Remove the door switch actuator.
11) Close the front door; then, make color copies to check the image reproduction.

Note:
Keep the CD unit's shipping box for storage.

b. Copier with CD unit Changer

1) Press the CD UNIT SELECT key on the CD unit changer's control panel to select the color of the toner contained in the CD unit being installed; Figure 5-21.
2) Press the CD UNIT OUT key; Figure 5-22.
   - Wait until the indicator stops flashing and remains ON.
3) Open the CD unit door, and slide out the CD unit.
4) Disengage the two locks, and open the CD unit's toner supply cover.
5) Shake the toner cartridge left and right several times to even out the toner.
6) Fit the toner cartridge into the CD unit.
7) Hold the toner cartridge, and pull the seal horizontally until the mark 'STOP' comes into view.
8) Tap on the top of the cartridge lightly.
9) Hold the CD unit; pick the cartridge, and detach the cartridge.
10) Close the toner supply cover, and engage the two locks.
11) Push the CD unit inside, and close the CD unit door.
12) Remove the door switch actuator.
13) Close the front door; then, make color copies to check the image reproduction.

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I. PERIODICALLY REPLACED PARTS

Some parts of the machine must be replaced on a periodical basis to maintain it original performance; replace them as shown even if they do not show signs of wear or damage. Arrange the replacement so that it coincides with a scheduled visit.

as of JAN. 1993

No.	Parts name	Parts No.	Q'ty	Estimated life (copies)	Remarks
1	Corona wire (primary, pre-transfer, transfer, separation)	FY3-0030-000	—	60,000	100V
		FY3-0040-000	—	60,000	115/220/240V
2	Pre-transfer corona assembly	FG1-8040-040	1	120,000	to prevent leakage to block.
3	Ozone filter (heat exhaust fan)	FB1-5681-000	1	210,000	or 1 yr.
4	Ozone filter (feeder fan)	FB1-6044-000	1	210,000	or 1 yr.
5	Filter (scanner cooling fan)	FA5-3010-000	1	210,000	or 1 yr.
6	Side seal (CD unit)	FA5-2720-000	2	210,000*	
7	Roll (CD unit)	FS2-6004-000	2	210,000*	

The values above are estimates only and subject to change based on field data.
* Copies processed using the CD unit.

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II. DURABLES

Some parts of the machine may become worn or damaged over its warranty period; replace them as necessary.

A. Copier

as of JAN. 1993

No.	Parts name	Parts No.	Q'ty	Estimated life (copies)	Remarks
1	Scanning lamp	FH7-3246-000	1	120,000	100/115V
		FH7-3247-000	1	120,000	230V
2	Pick-up roller (pick-up assembly)	FA5-2854-020	4	120,000	
3	Feeder roller (pick-up assembly)	FA5-2933-000	2	120,000	
4	Separation roller (pick-up assembly)	FA5-2867-000	2	120,000	
5	Drum separation claw	FA3-8577-030	4	120,000	
6	Transfer/Separation corona wire cleaner	FF5-0940-000	1	120,000	
7	Lower roller cleaner (fixing assembly)	FF2-0175-000	1	120,000	
8	Pre-exposure lamp	FH7-3232-000	1	210,000	
9	Lower roller (fixing assembly)	FB1-5921-000	1	210,000	
10	Upper separation claw (fixing assembly)	FA9-0451-000	4	210,000	
11	Lower separation claw (fixing assembly)	FA2-9037-000	4	210,000	
12	Insulating bush (fixing assembly)	FB1-5928-000	2	210,000	
13	Cleaning belt (fixing assembly)	FA3-8908-000	1	300,000	depends on length of copy paper.
14	Registration roller (lower)	FA5-3120-000	1	300,000	
15	Developing cylinder (black developing assembly)	FA5-2594-000	1	300,000	
16	Developing drive gear (black developing assembly)	FS3-0041-000	1	300,000	
17	Upper roller (fixing assembly)	FB1-5948-000	1	510,000	

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No.	Parts name	Parts No.	Q'ty	Estimated life (copies)	Remarks
18	Oil pad (front; registration roller)	FA5-3215-000	1	510,000	impregnate it with oil (CK-0451); make sure the oil will not drip.
19	Oil pad (rear; registration roller)	FA5-3216-000	1	510,000	
20	Lower feed roller (Lower)	FB1-5975-030	1	510,000	
21	Halogen heater (fixing assembly)	FH7-4255-000	1	510,000	100V
		FH7-4256-000	1	510,000	115V
		FH7-4297-000	1	510,000	230V
22	Scanner drive cable	FB1-6086-000	1	510,000	
23	Ball bearing (upper fixing roller)	XG9-0181-000	2	510,000	
24	Ball bearing (lower fixing roller)	XG9-0208-000	2	510,000	
25	ATR window (CD unit)	FA5-2672-000	1	60,000	*1
26	Starter (red; CD unit)	F41-6012-000	1	60,000	*1
	Starter (green; CD unit)	F41-6022-000	1	60,000	*1
27	Starter (blue; CD unit)	F41-6032-000	1	60,000	*1
	Starter (brown; CD unit)	F41-6042-000	1	60,000	*1
	Developing cylinder (CD unit)	FA5-2690-000	1	210,000	*1

The values above are estimates only and subject to change based on field data.
*1 Copies processed using the CD unit.

B. Cassette Feeding Unit

as of JAN. 1993

No.	Parts name	Parts No.	Q'ty	Estimated life (copies)	Remarks
1	Pick-up roller	FA5-2854-020	4	120,000	
2	Feeder roller	FA5-2933-000	2	120,000	
3	Separation roller	FA5-2867-000	2	120,000	

The values above are estimates only and subject to change based on field data.

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C. Paper Deck Pedestal

as of JAN. 1993

No.	Parts name	Parts No.	Q'ty	Estimated life (copies)	Remarks
1	Pick-up roller	FA5-2854-020	4	120,000	
2	Feeder roller	FL9-0015-000	2	120,000	
3	Separation roller	FL9-0010-000	2	120,000	

The values above are estimates only and subject to change based on field data.

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III. PERIODICAL SERVICING

Note:
i. As a rule, go over the steps every 30,000 copies.
ii. Check the Service Work Sheet before each visit; take replacement parts if replacement is expected.

No.	Work	Checks	Remarks
1	Meet the person in charge.	Check the general condition.	
2	Record the counter reading.	Check the faulty copies.	
3	Make test copies: DIRECT, REDUCE, ENLARGE, page separation, two-sided, overlay	Check the following: a. density of image b. dirt on background c. clarity of characters d. margin along leading edge e. margin on left/right f. fixing, blurring, soiling (back) g. abnormal noise h. counter operation	standards: 2.5 ± 1.5 mm (DIRECT) standards: 2.0 ± 1.0 mm (DIRECT)
4	Clean the pre-transfer corona assembly; do NOT clean the primary, transfer, and separation corona assembly.		Dry wipe the assembly; then, use alcohol solution.
5	Clean the transfer guide.		Detach the drum unit.
6	Clean the separation/feeder assembly. • separation claw • feeder belt • duplexing unit feeder guide		Attach the drum unit after cleaning.
7	Clean the fixing/delivery assembly. • paper guide • separation claw (upper, lower) • cleaning belt (check)		Use claning oil. (TKN-0464)
8	Perform periodical servicing according to the number of copies made; see IV.		
9	Clean the copyboard cover and the copyboard glass.		Use alcohol.
10	Make test copies.		

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No.	Work	Checks	Remarks
11	Make sample copies.		
12	Put the sample copies in order, and clean up the area.		
13	Record the counter reading.		
14	Fill out the Service Sheet, and report to the person in charge.		

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IV. PERIODICAL SERVICING CHART

Note:
Do not use solvents and oils other than those specified.

△: Clean ●: Replace ×: Oil □: Adjust ◎: Inspect

Unit	Parts	Maintenance intervals					Remarks
		every 30,000	every 60,000	every 120,000	every 210,000	every 510,000	
Externals	Copyboard glass	△					
	Ozone filter				●		or 1 yr.
	Scanner fan filter				●		
Scanner drive assembly	Scanner rail			△×			Clean it using alcohol solution; then, apply oil (CK-0451).
Transfer/ Separation assembly Feeder assembly	Transfer guide plate (upper, lower)	△					Use a moist cloth.
	Transfer/Separation corona assembly rail	△					
	Feeder belt, Feeder Guide plate	△					
Scanner	No.1 through No.6 mirrors	△					Use a blower brush; if necessary, use alcohol solution.
	Dust-proof glass	△					
	Lens	△					Use a blower brush.
	Reflector for scanning lamp	△					
	Side reflector for scanning lamp	△					
Corona assembly	Primary corona assembly	△					Do NOT clean the primary corona wire.
	Pre-transfer corona assembly	△		●			Dry wipe it using lint-free paper; then, use alcohol solution. Do NOT use water.
	Primary corona assembly grid wire	△					
	Shield plate, Block (primary, pre-transfer, transfer, separation)	△					
	Corona wire (primary, pre-transfer, transfer, separation)		●				Do NOT clean the corona wires.
CD unit	Roll	△			●		Use alcohol solution.
	Side seal				●		
Fixing assembly	Upper/Lower roller	△					Use cleaning oil (TKN-0464).
	Separation claw	△					Use solvent.
	Paper guide	△					

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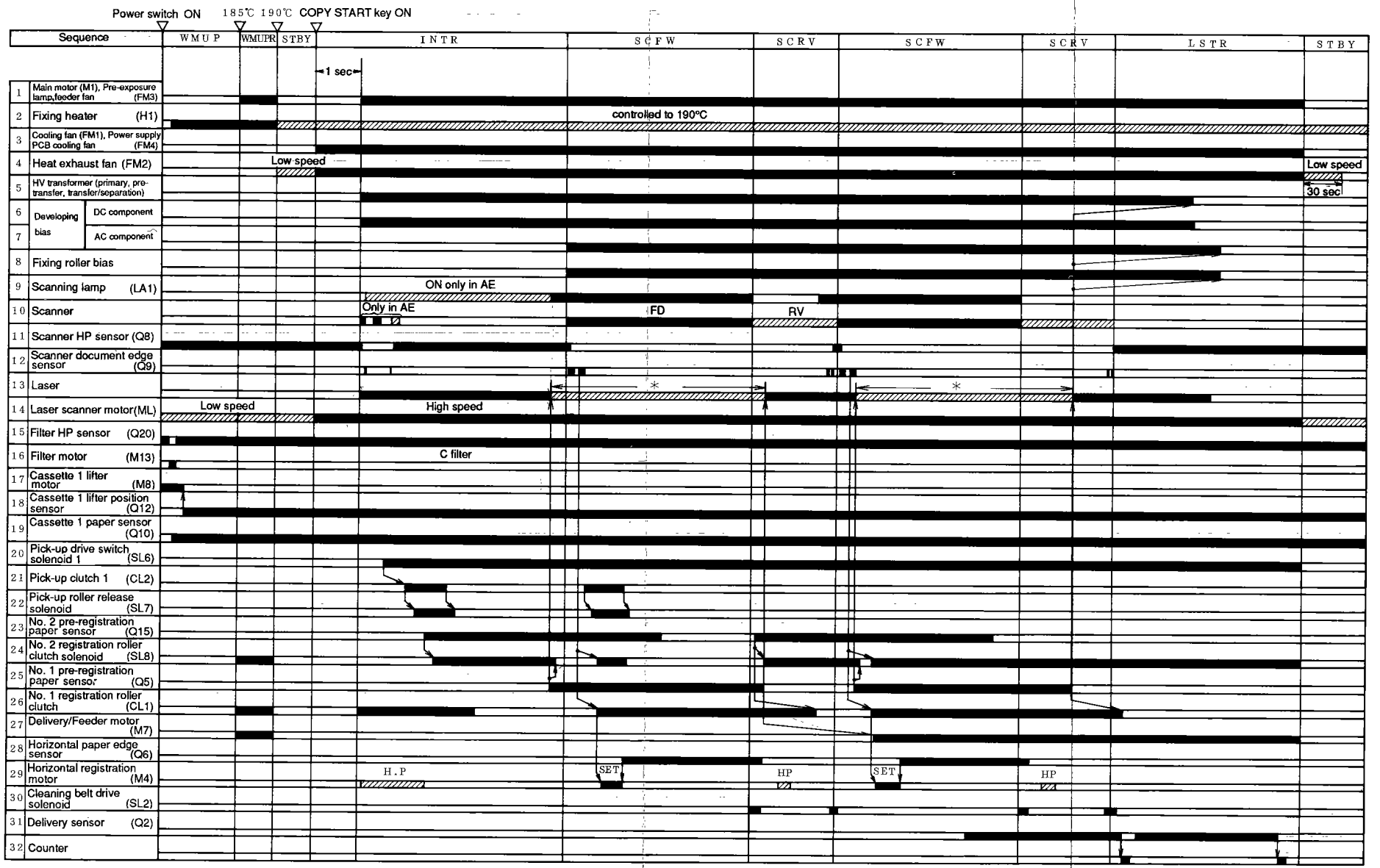
1. GENERAL TIMING CHART

A4, 2 Copies, Pick-Up from 1st Cassette, One-Sided Copy



*The laser ON control varies depending on the copy mode.

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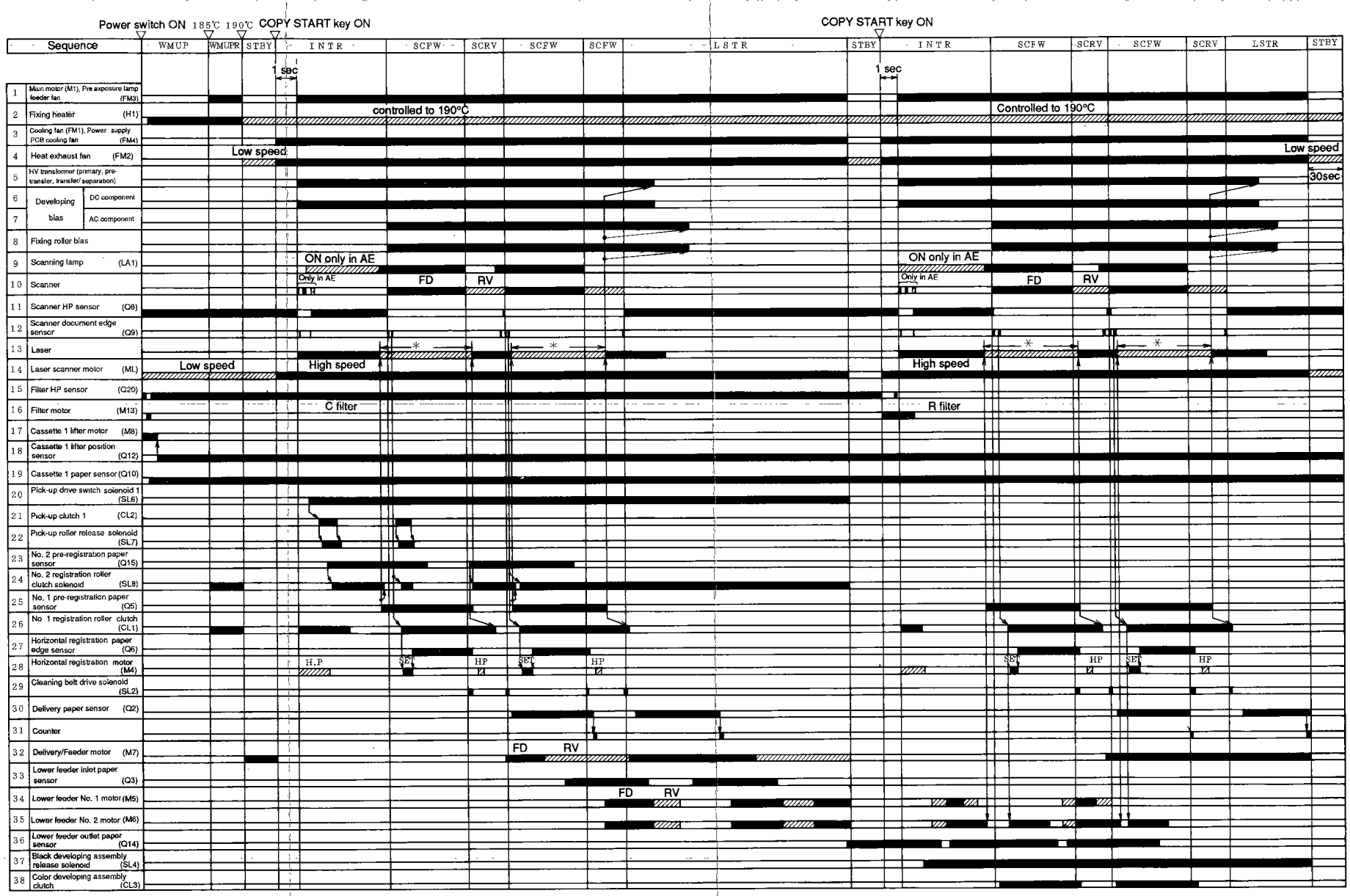
A4, 2 Copies, Pick-Up from 1st Cassette, Two-Sided Copy
(1st; black copy, 2nd; mono-color copy, Red ellimination mode)



*The laser ON control varies depending on the copy mode.

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1. SIGNALS/COMMANDS

ADSD	ADD-ON SHUTTER SOLENOID DRIVE command
BD	BEAM DETECT signal
BDRSD	BLACK DEVELOPING UNIT RELEASE CLUTCH SOLENOID DRIVE command
BTEP	BLACK TONER OUT signal
BTSP	BLACK TONER SUPPLY signal
BUSY	BUSY signal
C1LTMD	CASSETTE 1 LIFTER MOTOR DRIVE command
C2LTMD	CASSETTE 2 LIFTER MOTOR DRIVE command
C3LTMD	CASSETTE 3 LIFTER MOTOR DRIVE command
C4LTMD	CASSETTE 4 LIFTER MOTOR DRIVE command
C1LTP	CASSETTE 1 LIFTER POSITION signal
C2LTP	CASSETTE 2 LIFTER POSITION signal
C3LTP	CASSETTE 3 LIFTER POSITION signal
C4LTP	CASSETTE 4 LIFTER POSITION signal
C1PD	CASSETTE 1 PAPER DETECTION signal
C2PD	CASSETTE 2 PAPER DETECTION signal
C3PD	CASSETTE 3 PAPER DETECTION signal
C4PD	CASSETTE 4 PAPER DETECTION signal
CBCC	COPYBOARD COVER CLOSED signal
CCD	CONTROL COUNTER DRIVE command
CCDT	CONTROL COUNTER DETECTION signal
CDUDC	CD UNIT DOOR CLOSE signal
CDVLD	COLOR DEVELOPING UNIT CLUTCH DRIVE command
CLBSD	CLEANING BELT DRIVE SOLENOID DRIVE command
CLRD	CD UNIT CLAW RELEASE DETECT signal
CNT1D	COUNTER 1 DRIVE command
CNT2D	COUNTER 2 DRIVE command
CRD	CD UNIT RELEASE DETECT signal
CRGA	CROSS FEED REGISTRATION MOTOR DRIVE PULSE command A
CRGB	CROSS FEED REGISTRATION MOTOR DRIVE PULSE command B
CRGSTB	CROSS FEED REGISTRATION MOTOR STROVE signal
CRSD	CD UNIT CLAW RELEASE SOLENOID DRIVE command
CT1	COLOR TONER signal 1
CT2	COLOR TONER signal 2
CT3	COLOR TONER signal 3
CTEP1	COLOR TONER OUT signal 1
CTEP2	COLOR TONER OUT signal 2
CTLON	COLOR TONER LIGHT ON command
CTSSD	COLOR TONER SUPPLY SOLENOID DRIVE command
DFA	DELIVERY FEED MOTOR DRIVE PULSE command A
DFB	DELIVERY FEED MOTOR DRIVE PULSE command B
DKMD	DECK MOTOR DRIVE command
DLEDD1	DOCUMENT SIZE DETECTION LED DRIVE command 1
DLEDD2	DOCUMENT SIZE DETECTION LED DRIVE command 2
DLEDD3	DOCUMENT SIZE DETECTION LED DRIVE command 3
DSIN	DF SERIAL INPUT signal
DSOUT	DF SERIAL OUTPUT signal
DSZ1	DOCUMENT SIZE DETECTION signal 1 (analog)
DSZ2	DOCUMENT SIZE DETECTION signal 2 (analog)
DSZ3	DOCUMENT SIZE DETECTION signal 3 (analog)
EJECT	CD UNIT EJECT KEY signal
FICD	CD UNIT FEED IN CLUTCH DRIVE command
FILHP	FILTER HOME POSITION signal
FM1D	SCANNER INTAKE FAN (FM1) DRIVE command
FM2D	EXHAUST FAN (FM2) DRIVE command
FM3D	FEED FAN (FM3) DRIVE command
FM4D	POWER SUPPLY PCB COOLING FAN (FM4) DRIVE command
FM4ON	POWER SUPPLY PCB COOLING FAN (FM4) ON signal
FMA	FILTER MOTOR DRIVE PULSE A
FMB	FILTER MOTOR DRIVE PULSE B
FOCD	CD UNIT FEED OUT CLUTCH DRIVE command
FRD	CD UNIT FEED RELEASE DETECT signal
FRSD	CD UNIT FEED RELEASE SOLENOID DRIVE command
FRST	FIXING ROLLER SURFACE TEMPERATURE signal (analog)
FSD	CD UNIT FEED SOLENOID DRIVE command
HHP	CD UNIT HORIZONTAL FEED HOME POSITION signal
HLP	CD UNIT HORIZONTAL FEED LEFT POSITION signal
HMCLK	HORIZONTAL FEED MOTOR CLOCK signal
HMD	HORIZONTAL FEED MOTOR DRIVE command
HMD	HOPPER MOTOR DRIVE command
HMFO	HORIZONTAL FEED MOTOR FEED OUT command
HRP	CD UNIT HORIZONTAL FEED RIGHT POSITION signal
HTRD	HEATER DRIVE command
HVAC	AC TRANSFORMER DRIVE command
HVBAC	AC DEVELOPING BIAS DRIVE command
HVBDC	DC DEVELOPING BIAS CONTROL command (analog)
HVGB	GRID BIAS CONTROL command (analog)
HVPR	PRIMARY CORONA CURRENT CONTROL command (analog)
HVPT	PRE-TRANSFER CORONA CURRENT CONTROL command (analog)
HVSP	SEPARATION CORONA CURRENT CONTROL command (analog)
HVTR	TRANSFER CORONA CURRENT CONTROL command (analog)
LAON	SCANNING LAMP ON signal
LD	LASER DIODE DRIVE command (analog)
LDATA	LASER DATA signal
LDDE	LEFT DECK DETECT command
LHP	LENS HOME POSITION signal
LINT	LIGHT INTENSITY signal (analog)
LLDR	LEFT LIFTER CLUTCH DRIVE command
LLPDE	LEFT LIFTER POSITION DETECT signal
LLUL	LEFT LIFTER UPPER LIMIT signal
LMC	LASER MOTOR CONTROL command
LMCLK	LASER MOTOR CLOCK signal
LMD	LASER MOTOR DRIVE command
LMRDY	LASER MOTOR READY signal
LNA	LENS MOTOR DRIVE PULSE command A
LNB	LENS MOTOR DRIVE PULSE command B
LNSTB	LENS MOTOR STROVE signal
LPADE	LEFT PAPER DETECT signal
LPPDE	LEFT PAPER PATH PAPER DETECTION signal
LPPDR	LEFT PAPER CLUTCH DRIVE command
LPUDR	LEFT PAPER PICK-UP CLUTCH DRIVE command
LPURL	LEFT PAPER PICK-UP ROLLER RELEASE SOLENOID command
LRD	LAMP REGULATOR DRIVE command
LTDWN	LIFTER DOWN command
LF1A	LOWER FEED MOTOR 1 DRIVE PULSE command A
LF1B	LOWER FEED MOTOR 1 DRIVE PULSE command B
LF1STB	LOWER FEED MOTOR 1 STROVE signal
LF2A	LOWER FEED MOTOR 2 DRIVE PULSE command A
LF2B	LOWER FEED MOTOR 2 DRIVE PULSE command B
LF2STB	LOWER FEED MOTOR 2 STROVE signal
M2CLK	SCANNER MOTOR (M2) CLOCK signal
M2LK	SCANNER MOTOR (M2) PLL LOCK signal
MFDC	MANUAL FEED DOOR CLOSED signal
MFDO	MANUAL FEED DOOR OPEN signal
MFPD	MANUAL FEED PAPER DETECTION signal
MFRSD	MANUAL FEED ROLLER SOLENOID DRIVE command
MFSD	MANUAL FEED SELECT SOLENOID DRIVE command
MFSSD	MANUAL FEED SHUTTER SOLENOID DRIVE command
MMD	MAIN MOTOR DRIVE command
PCLHP	PRIMARY CORONA WIRE CLEANER HP signal
PCLMF	PRIMARY CORONA WIRE CLEANER FW command
PCLMR	PRIMARY CORONA WIRE CLEANER RV command
PCLRP	PRIMARY CORONA WIRE CLEANER RP signal
PD	PHOTO DIODE signal (analog)
PDP	PAPER DETECTION signal
PDP1	PAPER DETECTION signal 1
PDP2	PAPER DETECTION signal 2
PDP3	PAPER DETECTION signal 3
PDP4	PAPER DETECTION signal 4
PDP5	PAPER DETECTION signal 5
PDP6	PAPER DETECTION signal 6
PDP7	PAPER DETECTION signal 7
PDP8	PAPER DETECTION signal 8
PDPD	PAPER DETECTION signal
PEXP	PRE-CONDITIONING EXPOSURE LAMP LIT command
PRSD1	PICK-UP ROLLER RELEASE SOLENOID 1 DRIVE command
PRSD2	PICK-UP ROLLER RELEASE SOLENOID 2 DRIVE command
PSSD1	PICK-UP DRIVE SELECT SOLENOID 1 DRIVE command
PSSD2	PICK-UP DRIVE SELECT SOLENOID 2 DRIVE command
PUCD1	PICK-UP ROLLER CLUTCH 1 DRIVE command
PUCD2	PICK-UP ROLLER CLUTCH 2 DRIVE command
PUMD	PICK-UP ROLLER MOTOR DRIVE command
PWOFF	POWER SWITCH OFF command
RDDE	RIGHT DECK DETECTION signal
RGCD1	REGISTRATION ROLLER 1 CLUTCH DRIVE command
RGCD3	REGISTRATION ROLLER 3 CLUTCH DRIVE command
RGSD2	REGISTRATION ROLLER 2 CLUTCH SOLENOID DRIVE command
RGSD4	REGISTRATION ROLLER 4 CLUTCH SOLENOID DRIVE command
RLDC	RIGHT LOWER DOOR CLOSED signal
RLDR	RIGHT LIFTER CLUTCH DRIVE command
RLPDE	RIGHT LIFTER POSITION DETECTION signal
RLUL	RIGHT LIFTER UPPER LIMIT signal
RPADE	RIGHT PAPER DETECTION signal
RPUDR	RIGHT PAPER PICK-UP CLUTCH DRIVE command
RPURL	RIGHT PAPER PICK-UP ROLLER RELEASE SOLENOID command
SCCLK	SCANNER SPEED CONTROL command
SCDP	SCANNER AT LEADING EDGE POSITION signal
SCFW	SCANNER FORWARD command
SCHP	SCANNER HOME POSITION signal
SCMD	SCANNER MOTOR DRIVE command
SDODE	SIDE DOOR DETECT signal
SELECT	CD UNIT SELECT KEY signal

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SRER	SSR ERROR signal
TCLMF	TRANSFER/SEPARATION CORONA WIRE CLEANER FW command
TCLMR	TRANSFER/SEPARATION CORONA WIRE CLEANER RV command
TSCHP	TRANSFER/SEPARATION CORONA WIRE CLEANER HP signal
TSCRP	TRANSFER/SEPARATION CORONA WIRE CLEANER RP signal
VHP	CD UNIT VERTICAL FEED HOME POSITION signal
VMBK	VERTICAL FEED MOTOR BRAKE command
VMCLK	VERTICAL FEED MOTOR CLOCK signal
VMDWN	VERTICAL FEED MOTOR DOWN command
VMLSD	VERTICAL FEED MOTOR LOCK RELEASE SOLENOID DRIVE command
VMUP	VERTICAL FEED MOTOR UP command
VSYNC	VERTICAL SYNCHRONOUS signal
WTOF	EXCESS WASTE TONER signal

2. LIST OF ABBREVIATIONS

INTR	INITIAL ROTATION
LSTR	LAST ROTATION
SCFW	SCANNER FORWARD
SCRV	SCANNER REVERSE
STBY	STANDBY
WAIT	WAIT
WMUP	WARM UP
WMUPR	WARM UP ROTATION

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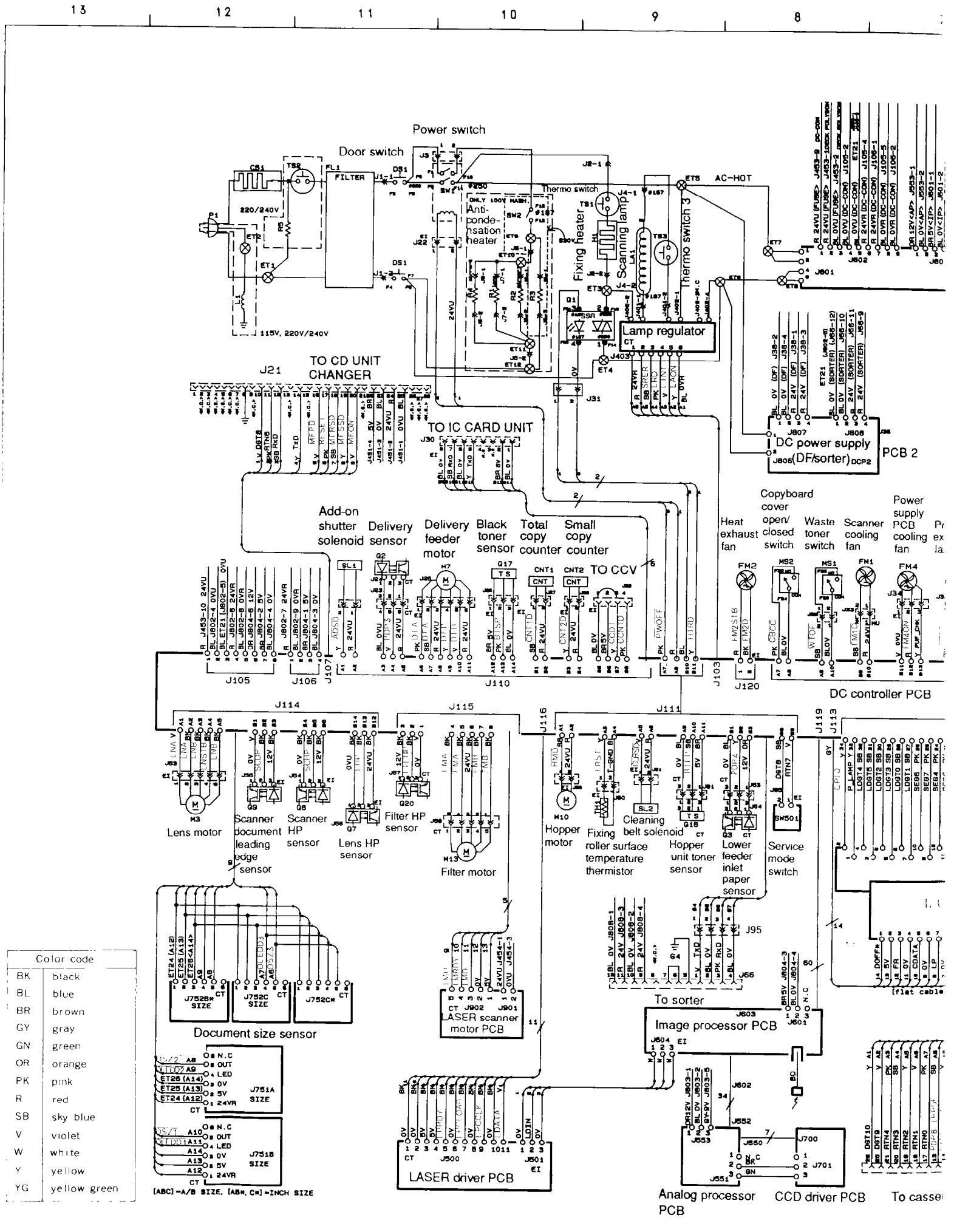
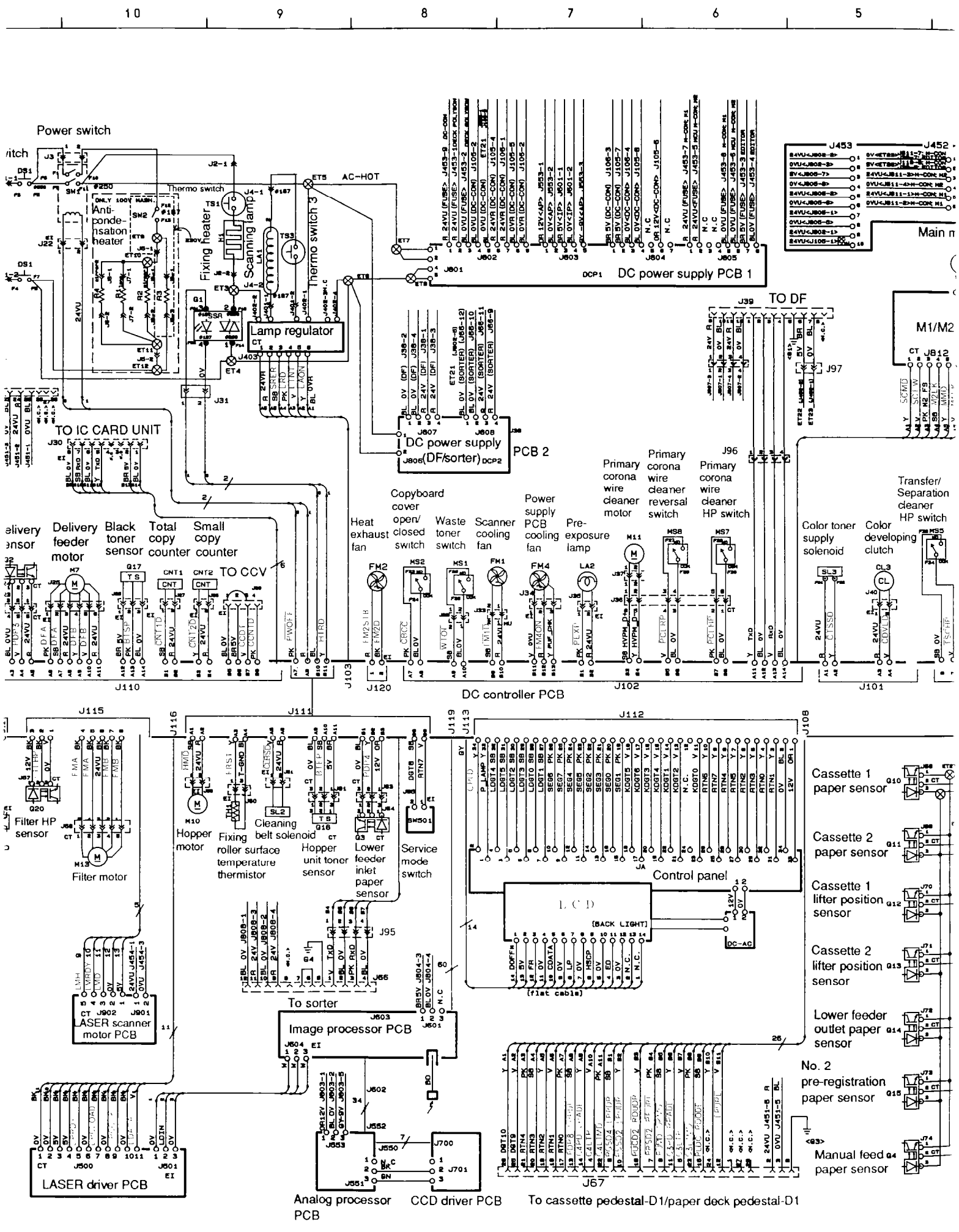
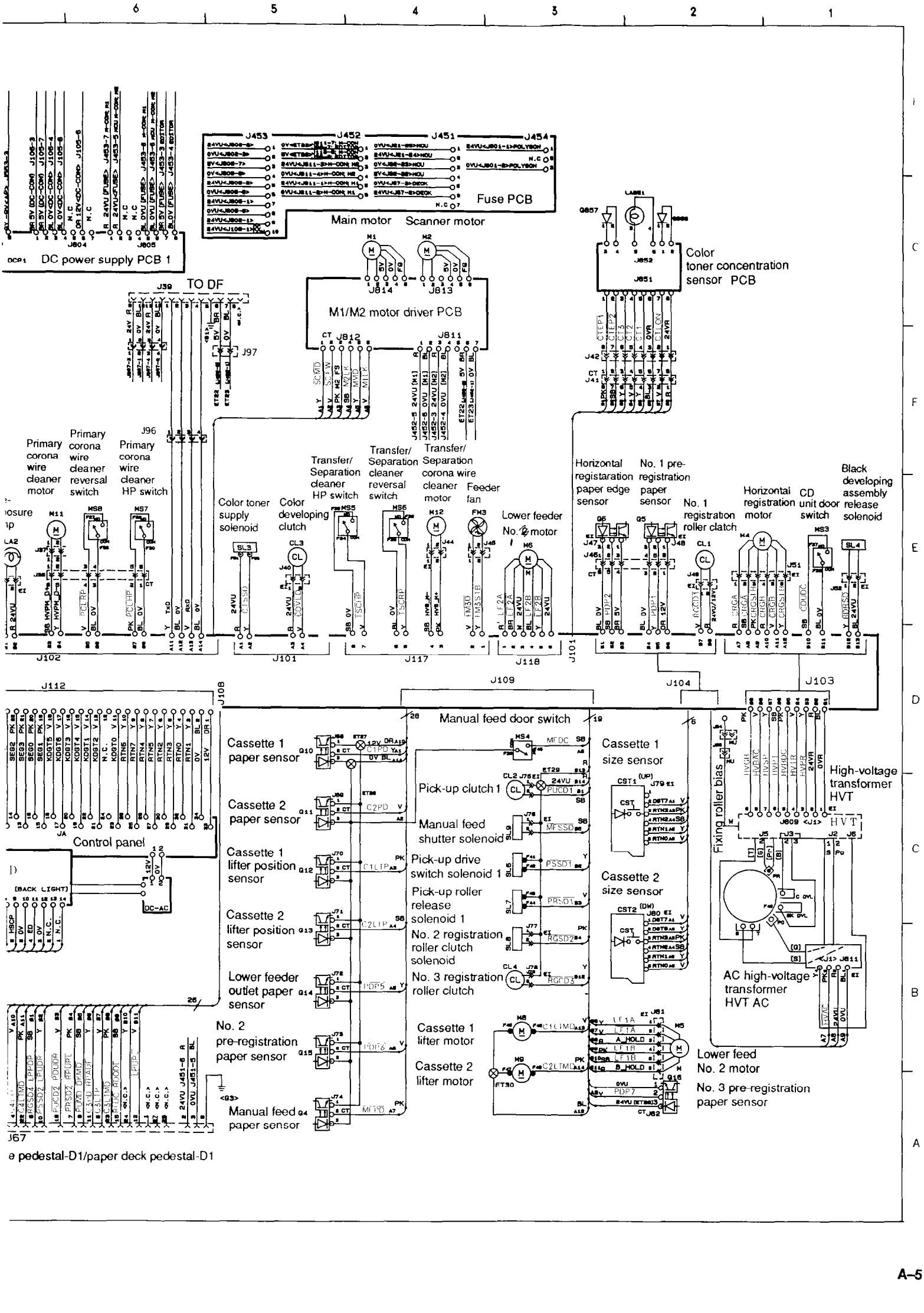
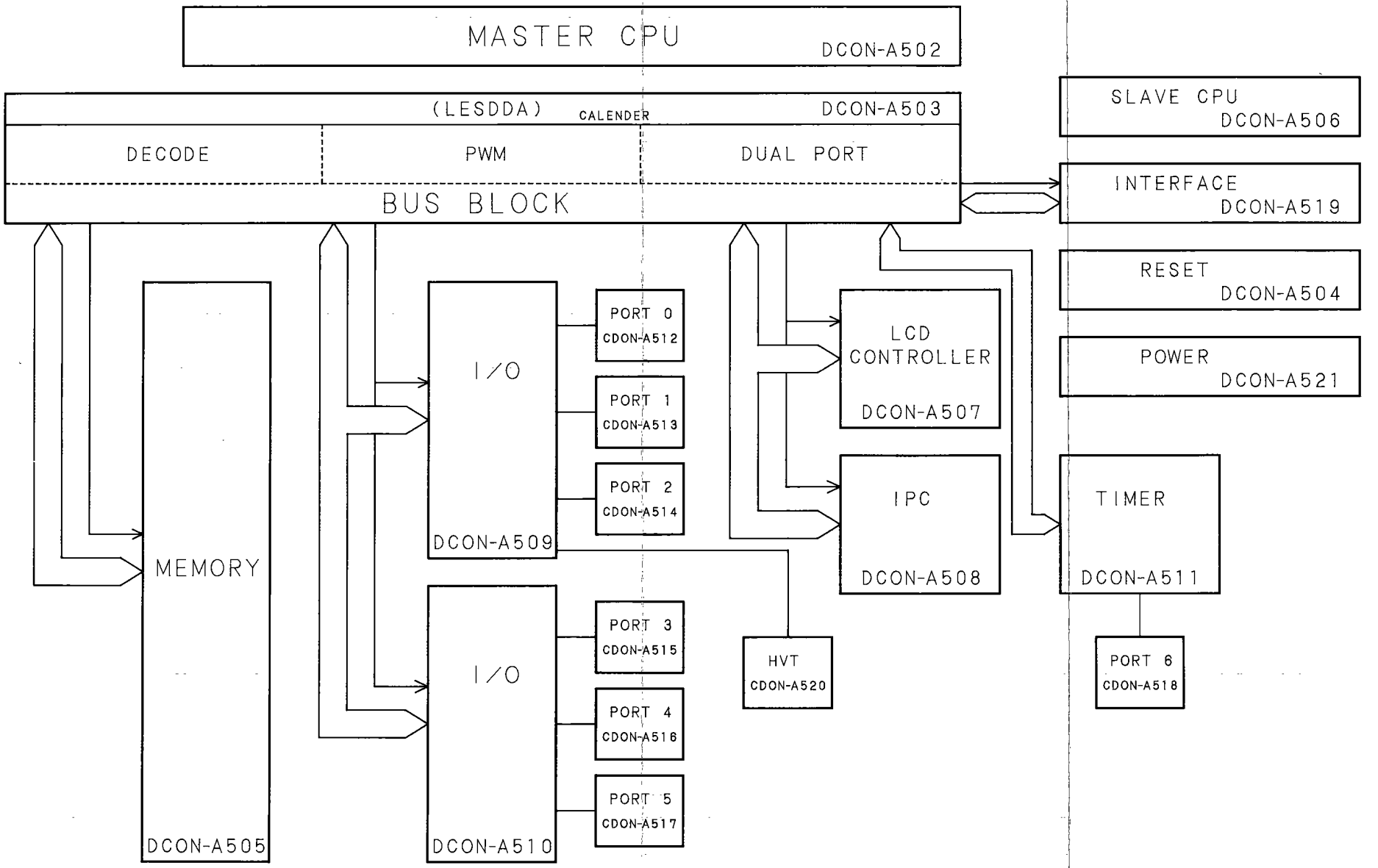

13
12
11
10
9
8
Power switch
Door switch
FILTER
220/240V
115V, 220V/240V
Anti-condensation heater
Thermo switch
Fixing heater
Scanning lamp
Thermo switch 3
AC-HOT
Lamp regulator
TO CD UNIT CHANGER
J21
TO IC CARD UNIT
J30
DC power supply
J806(DF/sorter)DCP2
PCB 2
Add-on shutter solenoid
Delivery sensor
Delivery feeder motor
Black toner sensor
Total copy counter
Small copy counter
TO CCV
Heat exhaust fan
Copyboard cover open/closed switch
Waste toner switch
Scanner cooling fan
Power supply PCB cooling fan
DC controller PCB
J105
J106
J107
J110
J103
J120
J114
J115
J116
J111
J119
J113
Lens motor
Scanner document leading edge sensor
Scanner HP sensor
Lens HP sensor
Filter HP sensor
Filter motor
Hopper motor
Fixing roller surface temperature thermistor
Cleaning belt solenoid
Hopper unit toner sensor
Lower feeder inlet paper sensor
Service mode switch
Document size sensor
J752B SIZE
J752C SIZE
J752CN
J751A SIZE
J751B SIZE
[ABC]=A/B SIZE, [ABN, CN]=INCH SIZE
LASER scanner motor PCB
LASER driver PCB
Image processor PCB
To sorter
[flat cable]
Analog processor PCB
CCD driver PCB
To casse
Color code
BK black
BL blue
BR brown
GY gray
GN green
OR orange
PK pink
R red
SB sky blue
V violet
W white
Y yellow
YG yellow green


Power switch
Thermo switch
Anti-condensation heater
Fixing heater
Scanning lamp
Thermo switch 3
AC-HOT
Lamp regulator
DC power supply PCB 1
DC power supply (DF/sorter) PCB 2
TO DF
TO IC CARD UNIT
TO CCV
Delivery sensor
Delivery feeder motor
Black toner sensor
Total copy counter
Small copy counter
Heat exhaust fan
Copyboard cover open/closed switch
Waste toner switch
Scanner cooling fan
Power supply PCB cooling fan
Pre-exposure lamp
Primary corona wire cleaner motor
Primary corona wire cleaner reversal switch
Primary corona wire cleaner HP switch
Color toner supply solenoid
Color developing clutch
Transfer/Separation cleaner HP switch
DC controller PCB
Filter HP sensor
Filter motor
Hopper motor
Fixing roller surface temperature thermistor
Cleaning belt solenoid
Hopper unit toner sensor
Lower feeder inlet paper sensor
Service mode switch
Control panel
L C D
[BACK LIGHT]
Cassette 1 paper sensor
Cassette 2 paper sensor
Cassette 1 lifter position sensor
Cassette 2 lifter position sensor
Lower feeder outlet paper sensor
No. 2 pre-registration paper sensor
Manual feed paper sensor
To sorter
Image processor PCB
LASER scanner motor PCB
LASER driver PCB
Analog processor PCB
CCD driver PCB
To cassette pedestal-D1/paper deck pedestal-D1
Main m
M1/M2


DC power supply PCB 1
Fuse PCB
Main motor
Scanner motor
M1/M2 motor driver PCB
TO DF
Color toner concentration sensor PCB
Primary corona wire cleaner motor
Primary corona wire cleaner reversal switch
Primary corona wire cleaner HP switch
Color toner supply solenoid
Color developing clutch
Transfer/ Separation cleaner HP switch
Transfer/ Separation cleaner reversal switch
Transfer/ Separation corona wire cleaner motor
Feeder fan
Lower feeder No. 2 motor
Horizontal registaration paper edge sensor
No. 1 pre-registration paper sensor
No. 1 registration roller clatch
Horizontal registration motor
CD unit door switch
Black developing assembly release solenoid
Manual feed door switch
Cassette 1 paper sensor
Cassette 2 paper sensor
Cassette 1 lifter position sensor
Cassette 2 lifter position sensor
Lower feeder outlet paper sensor
No. 2 pre-registration paper sensor
Manual feed paper sensor
Pick-up clutch 1
Manual feed shutter solenoid
Pick-up drive switch solenoid 1
Pick-up roller release solenoid 1
No. 2 registration roller clutch solenoid
No. 3 registration roller clutch
Cassette 1 lifter motor
Cassette 2 lifter motor
Cassette 1 size sensor
Cassette 2 size sensor
Fixing roller bias
High-voltage transformer HVT
AC high-voltage transformer HVT AC
Lower feed No. 2 motor
No. 3 pre-registration paper sensor
Control panel
e pedestal-D1/paper deck pedestal-D1

DC CONTROLLER CIRCUIT DIAGRAM (A501: block diagram)



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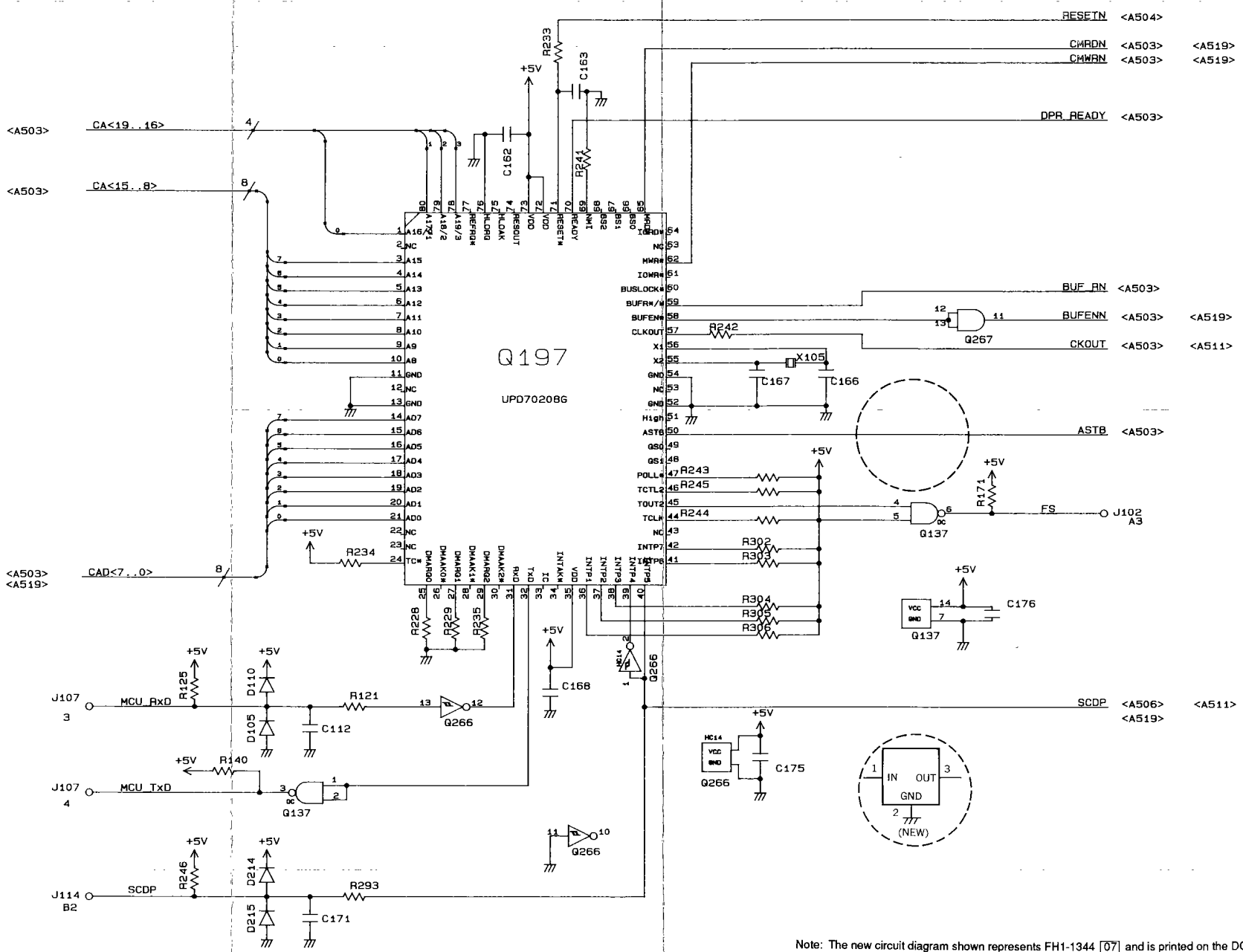
DC CONTROLLER CIRCUIT DIAGRAM (A502: CPU)



Note: The new circuit diagram shown represents FH1-1344 [07] and is printed on the DC controller PCB.

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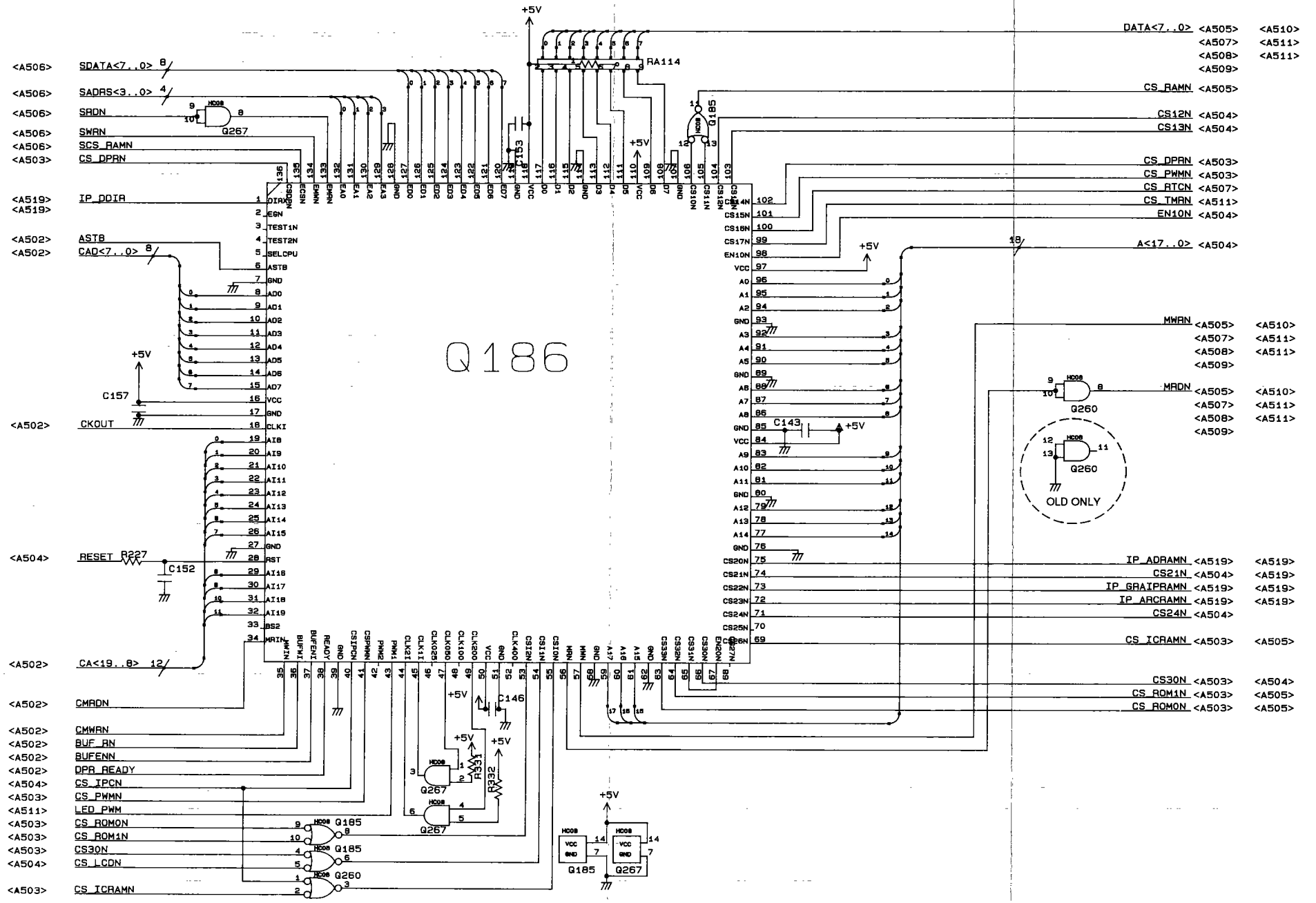

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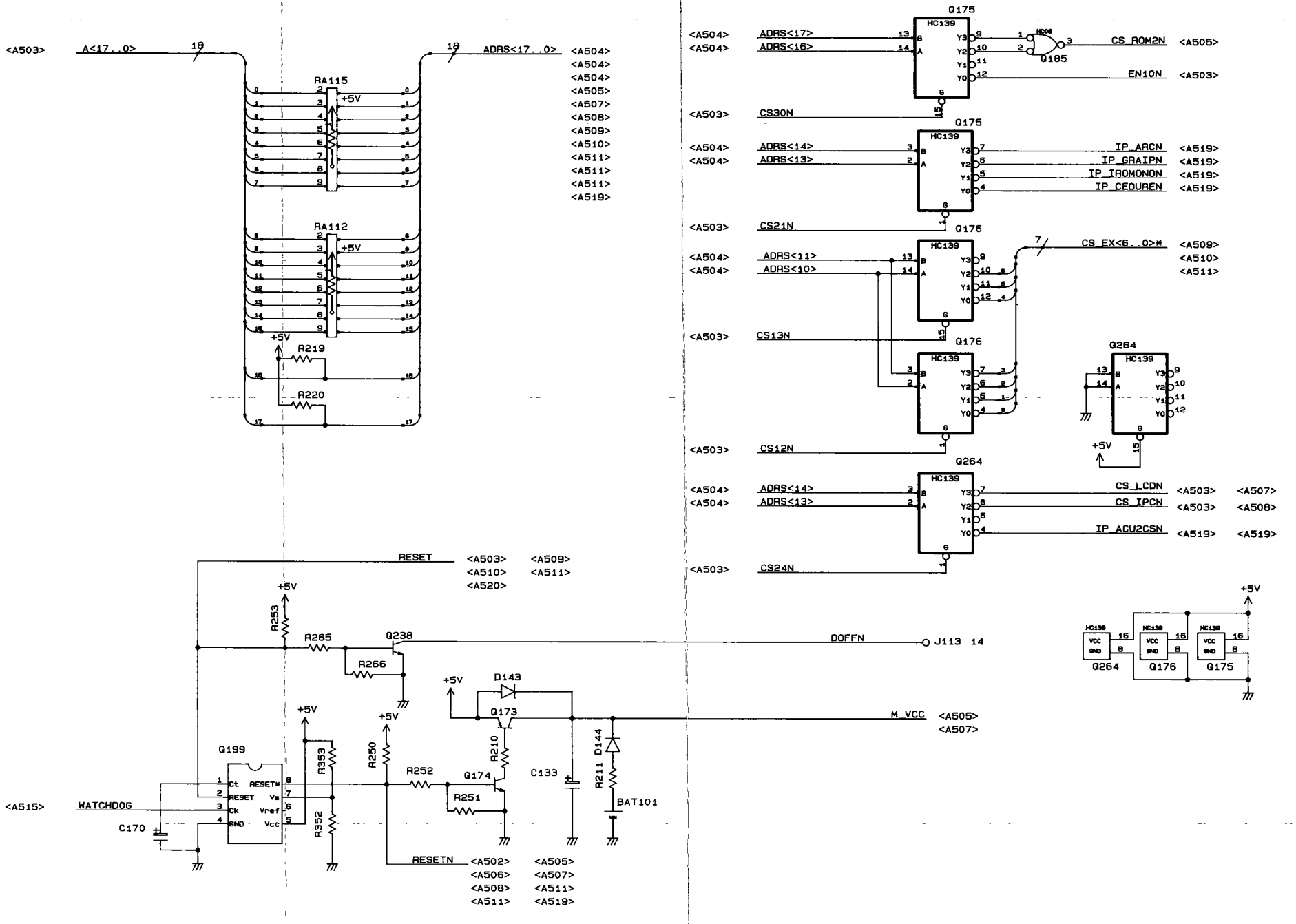
DC CONTROLLER CIRCUIT DIAGRAM (A504: reset circuit)



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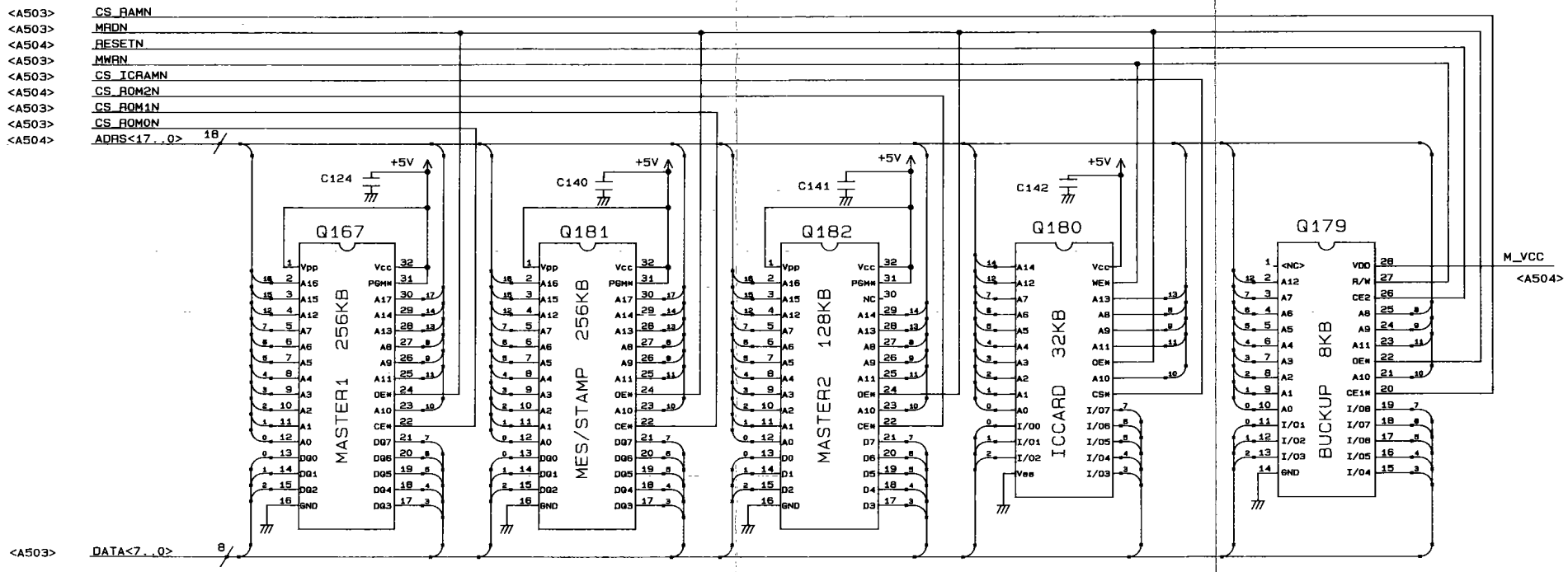

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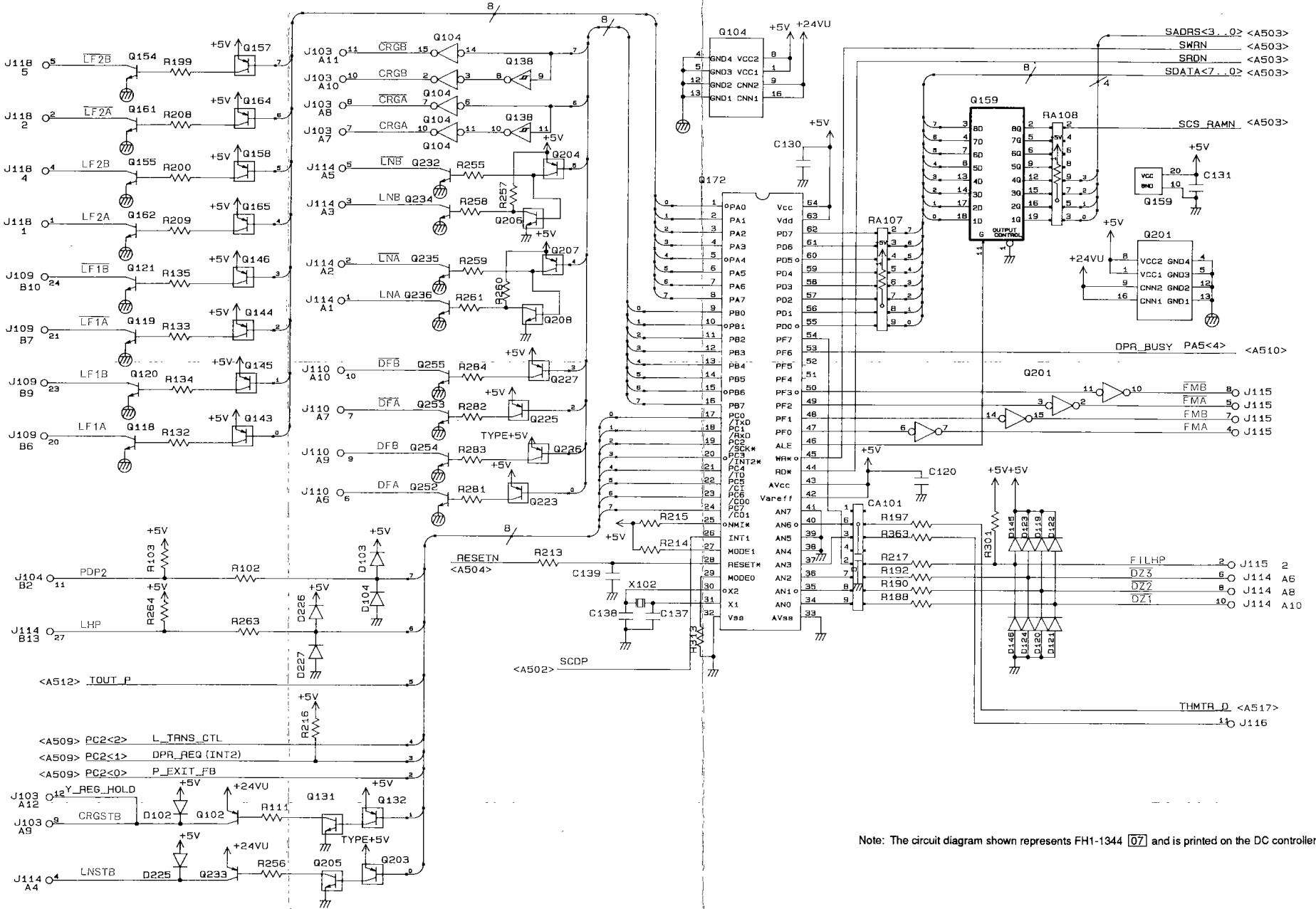
DC CONTROLLER CIRCUIT DIAGRAM (A506: Sub CPU)

NEW


J118 5 LF2B Q154 R199 Q157
J118 2 LF2A Q161 R208 Q164
J118 4 LF2B Q155 R200 Q158
J118 1 LF2A Q162 R209 Q165
J109 B10 LF1B Q121 R135 Q146
J109 B7 LF1A Q119 R133 Q144
J109 B9 LF1B Q120 R134 Q145
J109 B6 LF1A Q118 R132 Q143
J103 A11 CRGB Q104
J103 A10 CRGB Q104
J103 A8 CRGA Q104
J103 A7 CRGA Q104
Q138
J114 A5 LNB Q232 R255 Q204
J114 A3 LNB Q234 R258 R257 Q206
J114 A2 LNA Q235 R259 R260 Q207
J114 A1 LNA Q236 R261 Q208
J110 A10 DFB Q255 R284 Q227
J110 A7 DFA Q253 R282 Q225
J110 A9 DFB Q254 R283 TYPE+5V Q226
J110 A6 DFA Q252 R281 Q223
Q104 +5V +24VU
GND4 VCC2 GND3 VCC1 GND2 CNN2 GND1 CNN1
C130
Q172
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
PC0 /TxD PC1 /RxD PC2 /SCK* PC3 /INT2* PC4 /I0 PC5 /C1 PC6 /C00 PC7 /C01
NMI* INT1 MODE1 RESET* MODE0 X2 X1 Vss
Vcc Vdd PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0 PF7 PF6 PF5 PF4 PF3 PF2 PF1 PF0 ALE WR* RD* AVcc Vareff AN7 AN6 AN5 AN4 AN3 AN2 AN1 AN0 AVss
R215 R214 R213 RESETN <A504>
C139 X102 C138 C137
SCDP <A502>
RA107
Q159 RA108
SADRS<3..0> <A503>
SWRN <A503>
SRDN <A503>
SDATA<7..0> <A503>
SCS_RAMN <A503>
C131
Q201
DPR_BUSY PA5<4> <A510>
FMB FMA FMB FMA
C120
CA101
R197 R363 R217 R192 R190 R188
R301
FILHP DZ3 DZ2 DZ1
THMTR_D <A517>
PDP2 R103 R102 D103 D104
LHP R264 R263 D226 D227
<A512> TOUT_P
R216
<A509> PC2<2> L_TRNS_CTL
<A509> PC2<1> DPR_REQ (INT2)
<A509> PC2<0> P_EXIT_FB
J103 A12 Y_REG_HOLD
J103 A9 CRGSTB D102 Q102 R111 Q131 Q132 TYPE+5V
J114 A4 LNSTB D225 Q233 R256 Q205 Q203

Note: The circuit diagram shown represents FH1-1344 [07] and is printed on the DC controller PCB.

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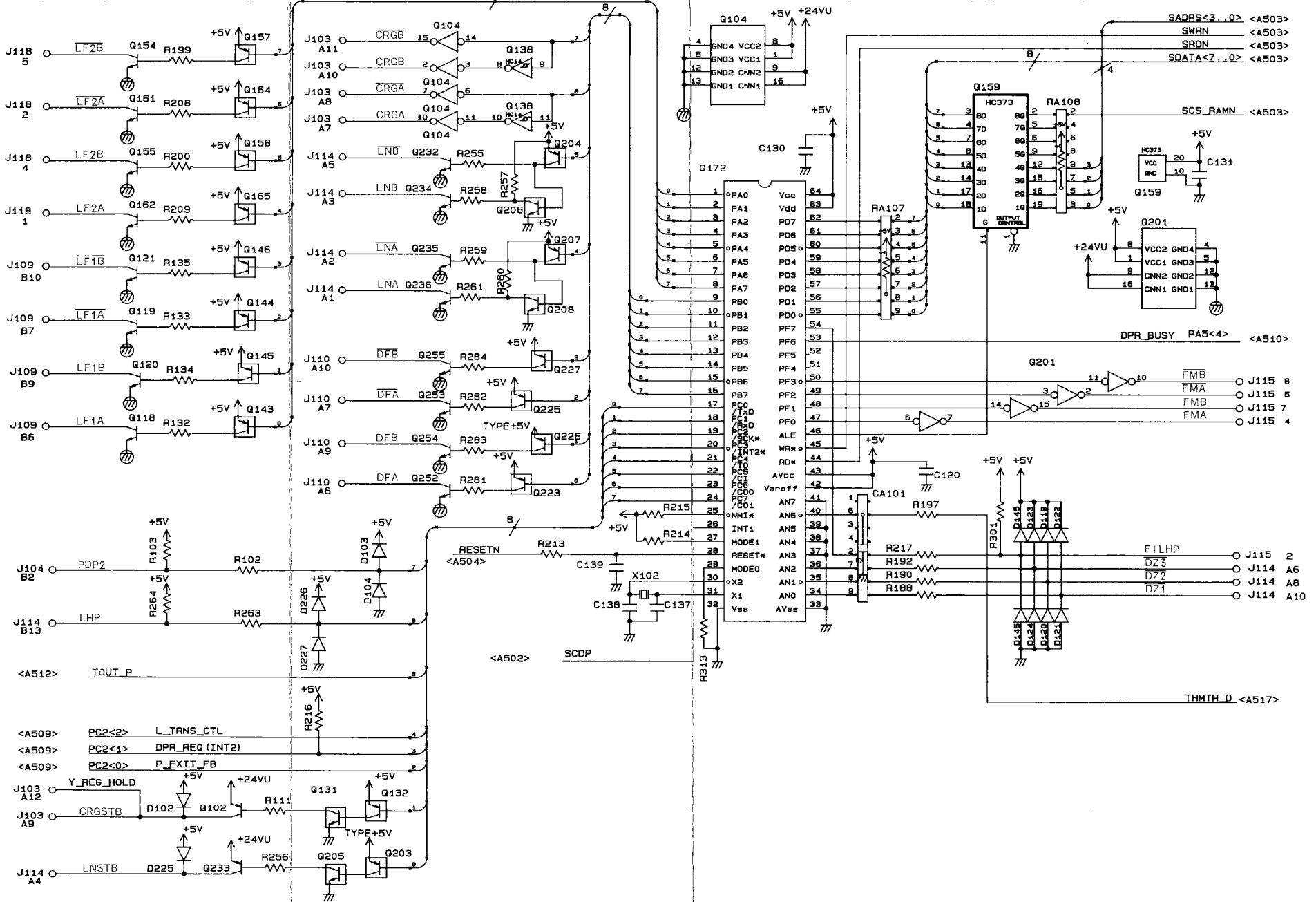
OLD


J118 5 LF2B Q154 R199 Q157
J118 2 LF2A Q161 R208 Q164
J118 4 LF2B Q155 R200 Q158
J118 1 LF2A Q162 R209 Q165
J109 B10 LF1B Q121 R135 Q146
J109 B7 LF1A Q119 R133 Q144
J109 B9 LF1B Q120 R134 Q145
J109 B6 LF1A Q118 R132 Q143
+5V
J103 A11 CRGB Q104 Q138
J103 A10 CRGB
J103 A8 CRGA Q104 Q138
J103 A7 CRGA Q104
Q104
J114 A5 LNB Q232 R255 Q204
J114 A3 LNB Q234 R258 R257 Q206
J114 A2 LNA Q235 R259 Q207
J114 A1 LNA Q236 R261 R260 Q208
J110 A10 DFB Q255 R284 Q227
J110 A7 DFA Q253 R282 Q225
J110 A9 DFB Q254 R283 TYPE+5V Q226
J110 A6 DFA Q252 R281 Q223
+24VU
Q104
GND4 VCC2
GND3 VCC1
GND2 CNN2
GND1 CNN1
C130
Q172
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
PC0 /TXD PC1 /RXD PC2 /SCK* PC3 /INT2* PC4 /TO PC5 /CI PC6 /CO0 PC7 /CO1
NMI* INT1 MODE1 RESET* MODE0 X2 X1 Vss
Vcc Vdd PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0
PF7 PF6 PF5 PF4 PF3 PF2 PF1 PF0
ALE WR* RD*
AVcc Varef
AN7 AN6 AN5 AN4 AN3 AN2 AN1 AN0 AVss
R215 R214 R213 RESETN <A504>
C139 X102 C138 C137 R313
<A502> SCDP
RA107
Q159 HC373 RA108
C131
Q201
C120 CA101 R197
R217 R192 R190 R188
R301
SADRS<3..0> <A503>
SWRN <A503>
SRDN <A503>
SDATA<7..0> <A503>
SCS_RAMN <A503>
DPR_BUSY PA5<4> <A510>
FMB FMA FMB FMA
J115 8 J115 5 J115 7 J115 4
FILHP J115 2
DZ3 J114 A6
DZ2 J114 A8
DZ1 J114 A10
THMTR_D <A517>
J104 B2 PDP2 R103 R102 D103 D104
J114 B13 LHP R264 R263 D226 D227
<A512> TOUT_P
<A509> PC2<2> L_TRNS_CTL
<A509> PC2<1> DPR_REQ (INT2)
<A509> PC2<0> P_EXIT_FB R216
J103 A12 Y_REG_HOLD D102 Q102 R111 Q131 Q132 TYPE+5V
J103 A9 CRGSTB
J114 A4 LNSTB D225 Q233 R256 Q205 Q203 TYPE+5V

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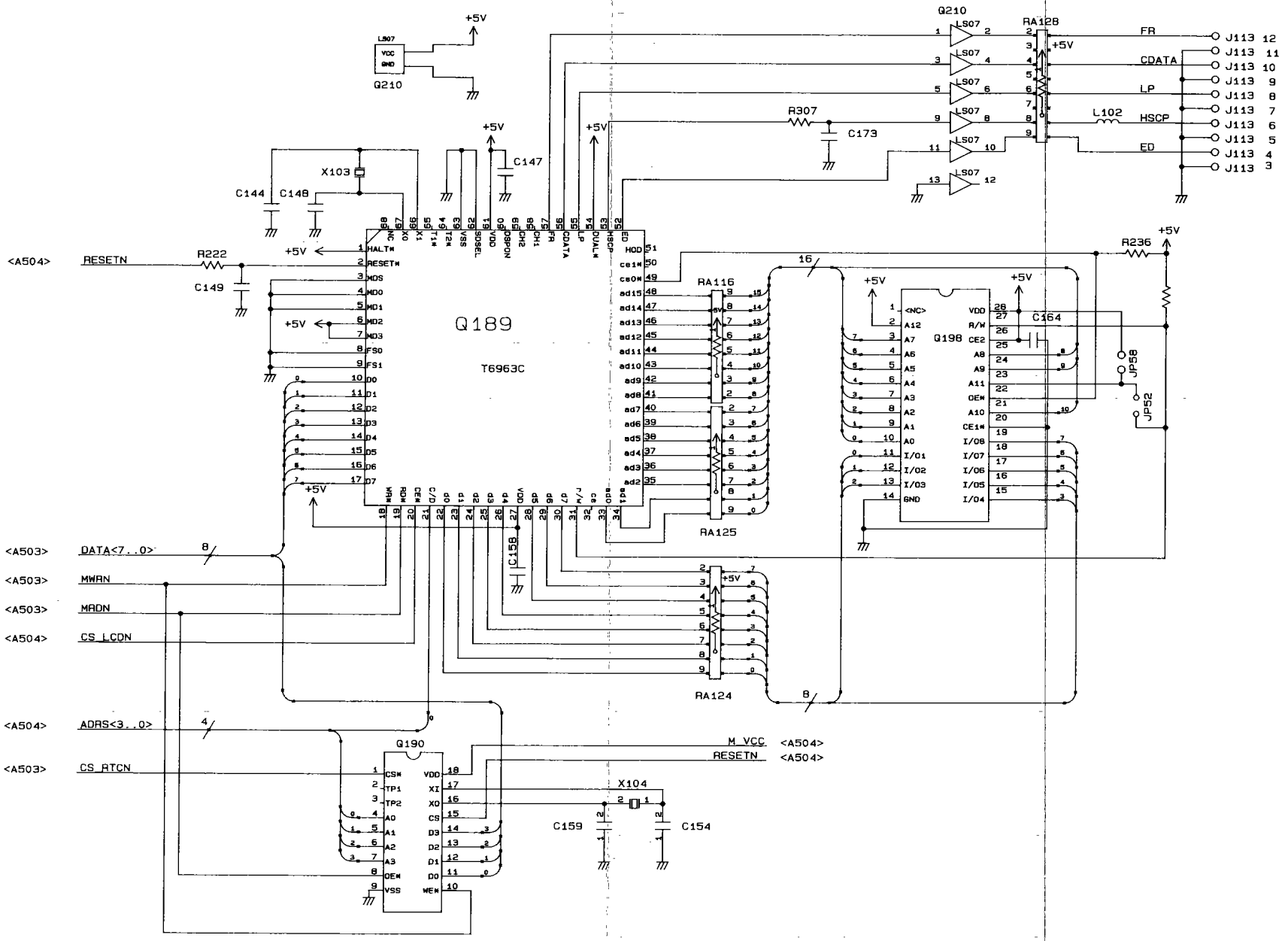

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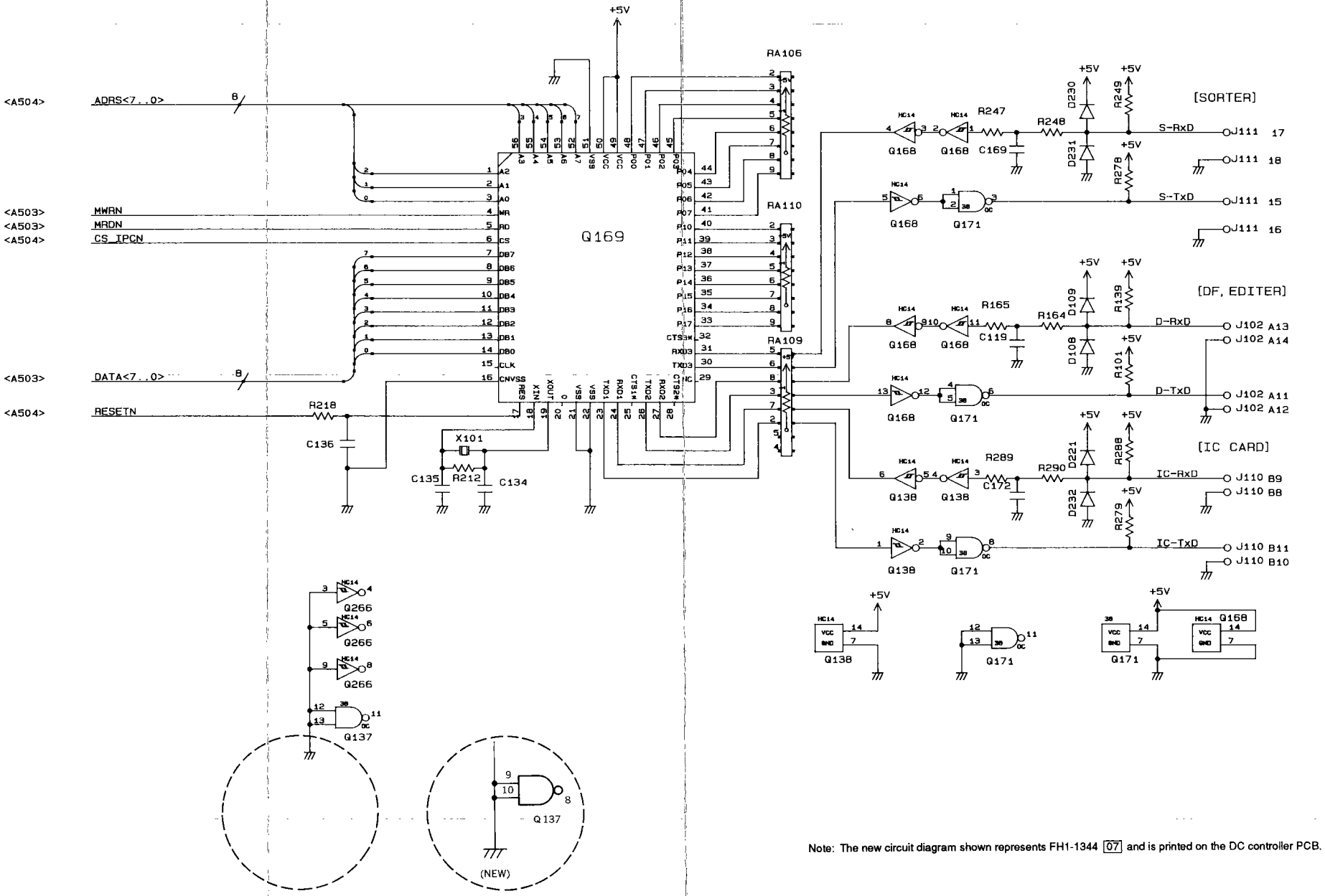
DC CONTROLLER CIRCUIT DIAGRAM (A508: IPC)



Note: The new circuit diagram shown represents FH1-1344 [07] and is printed on the DC controller PCB.

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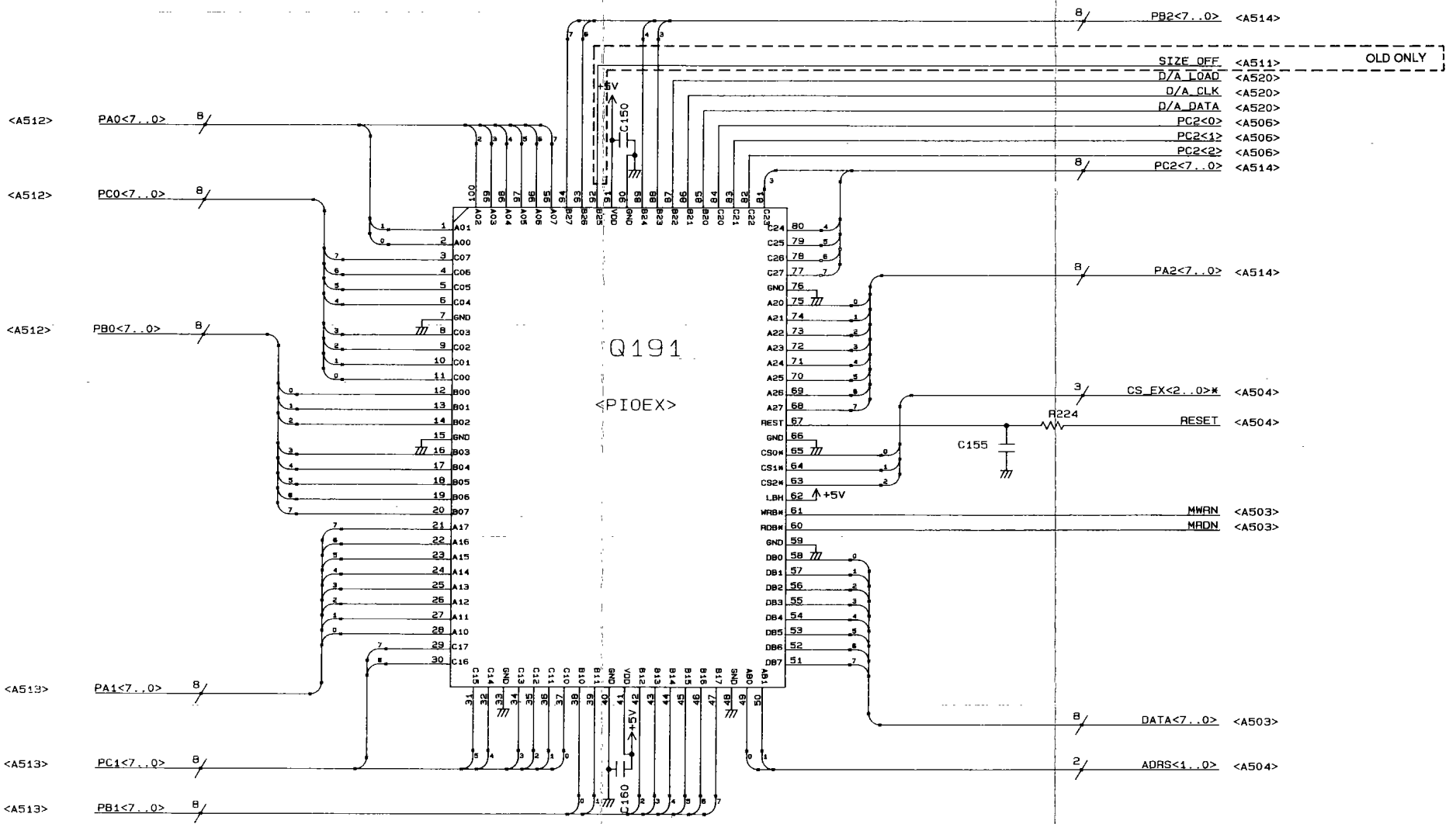

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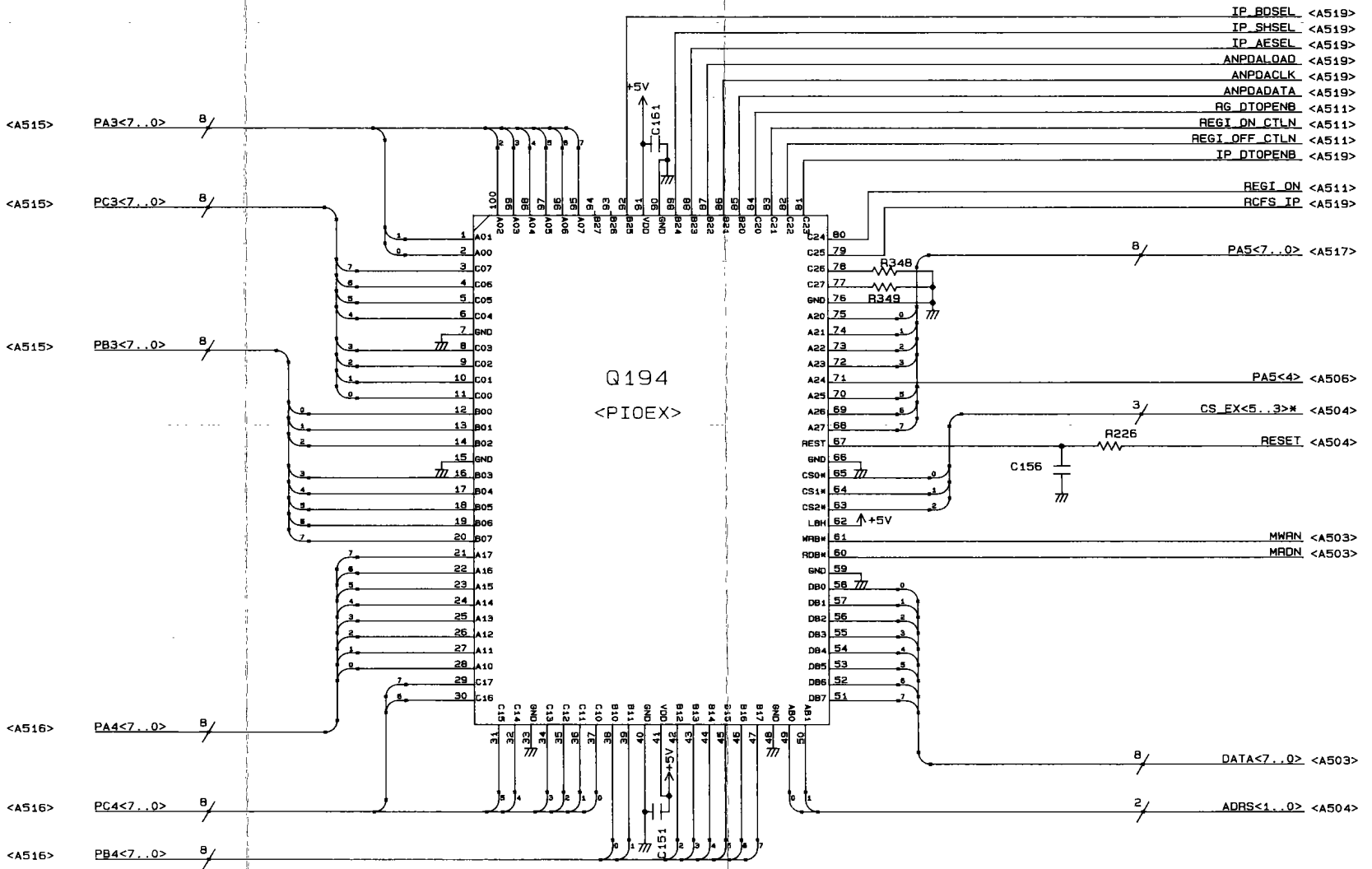

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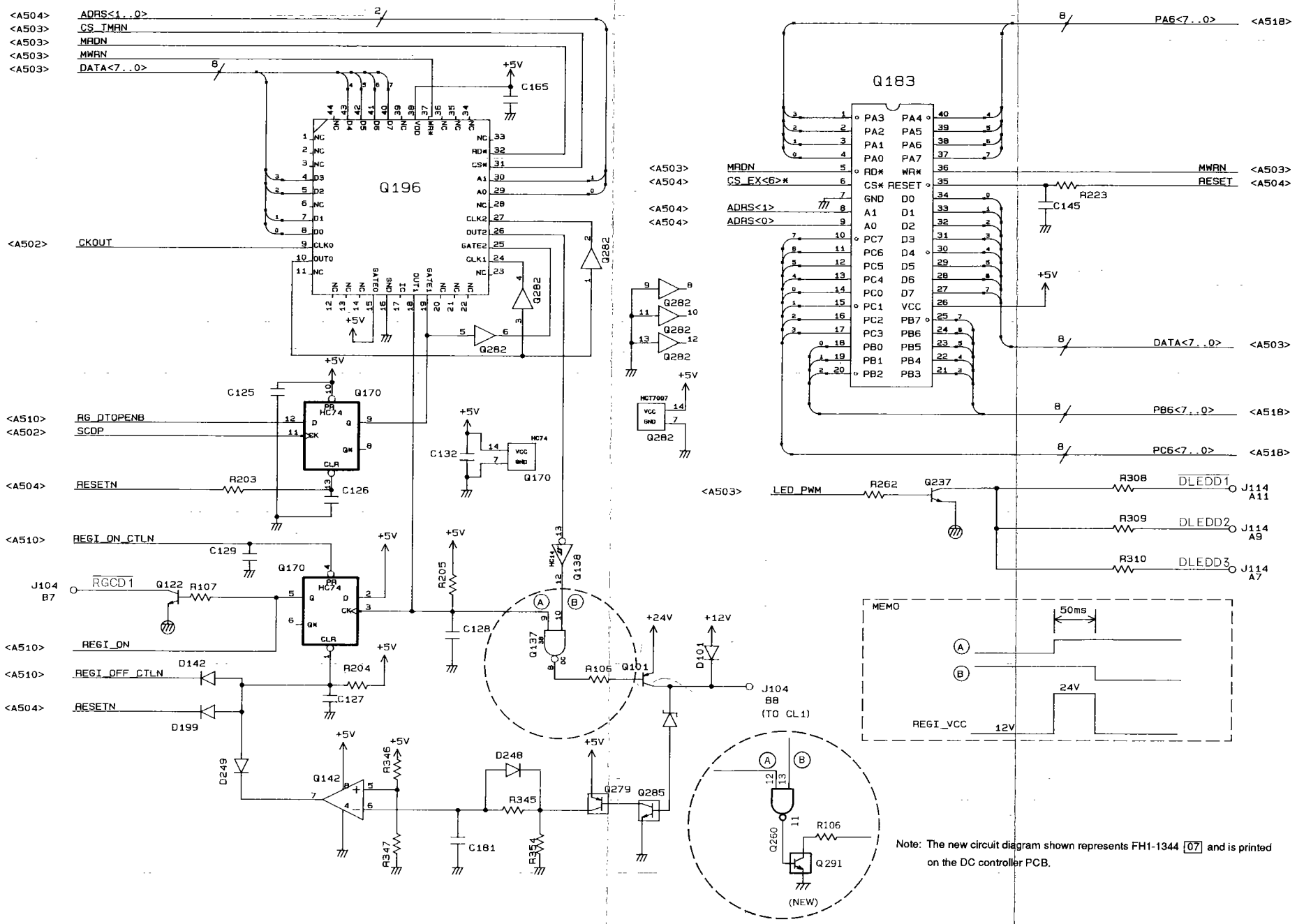

Note: The new circuit diagram shown represents FH1-1344 [07] and is printed on the DC controller PCB.

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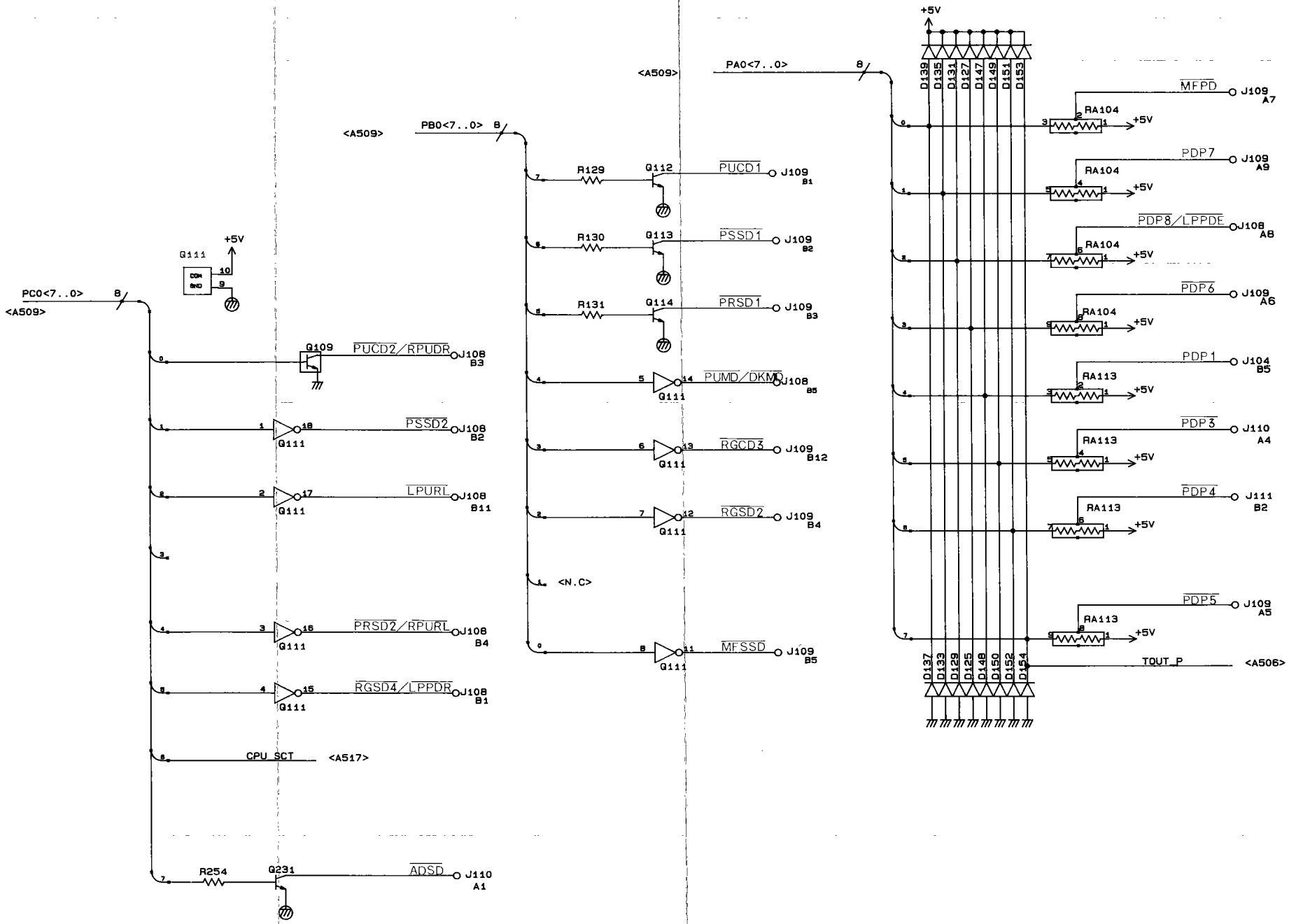
DC CONTROLLER CIRCUIT DIAGRAM (A512: EX0)



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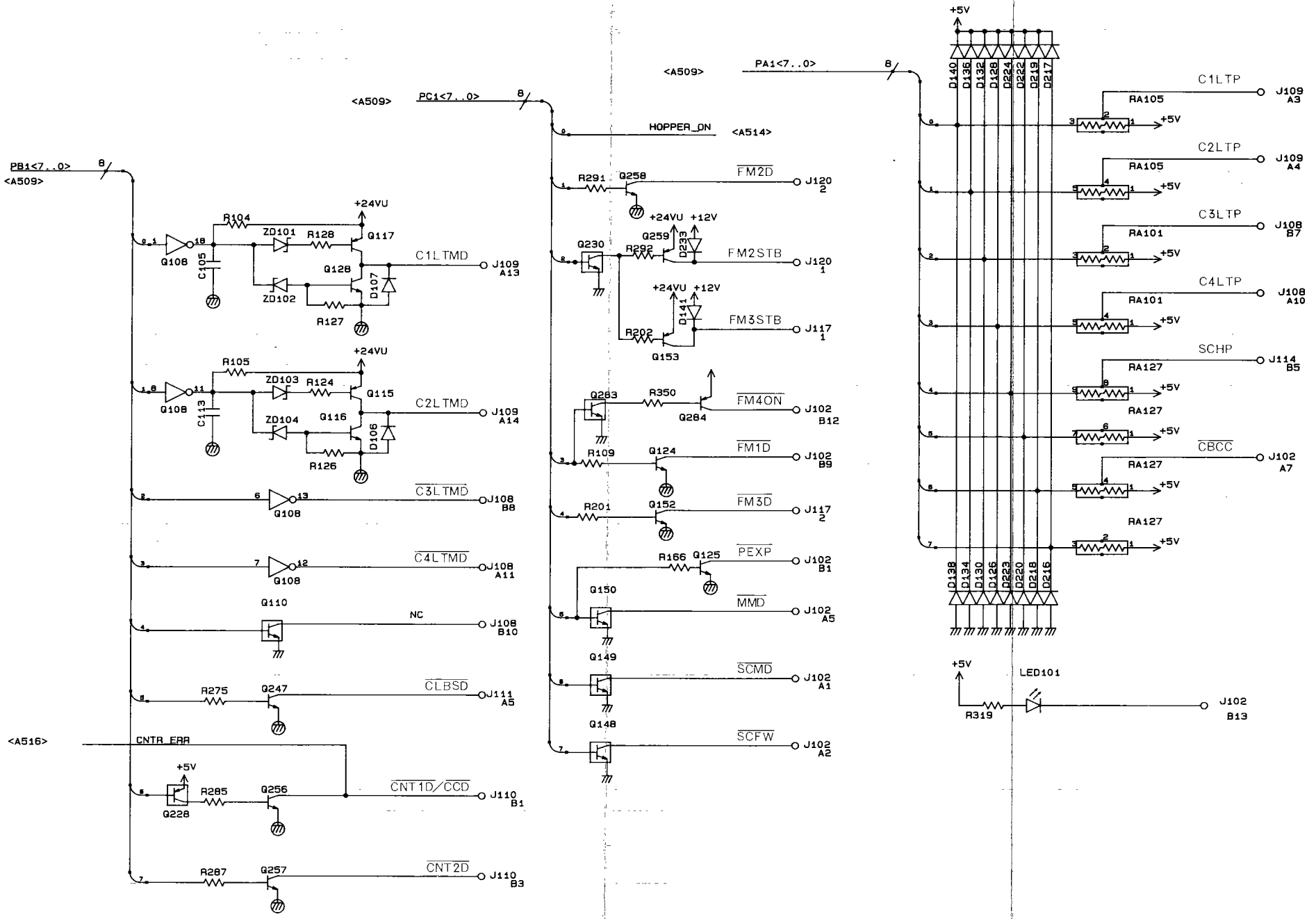

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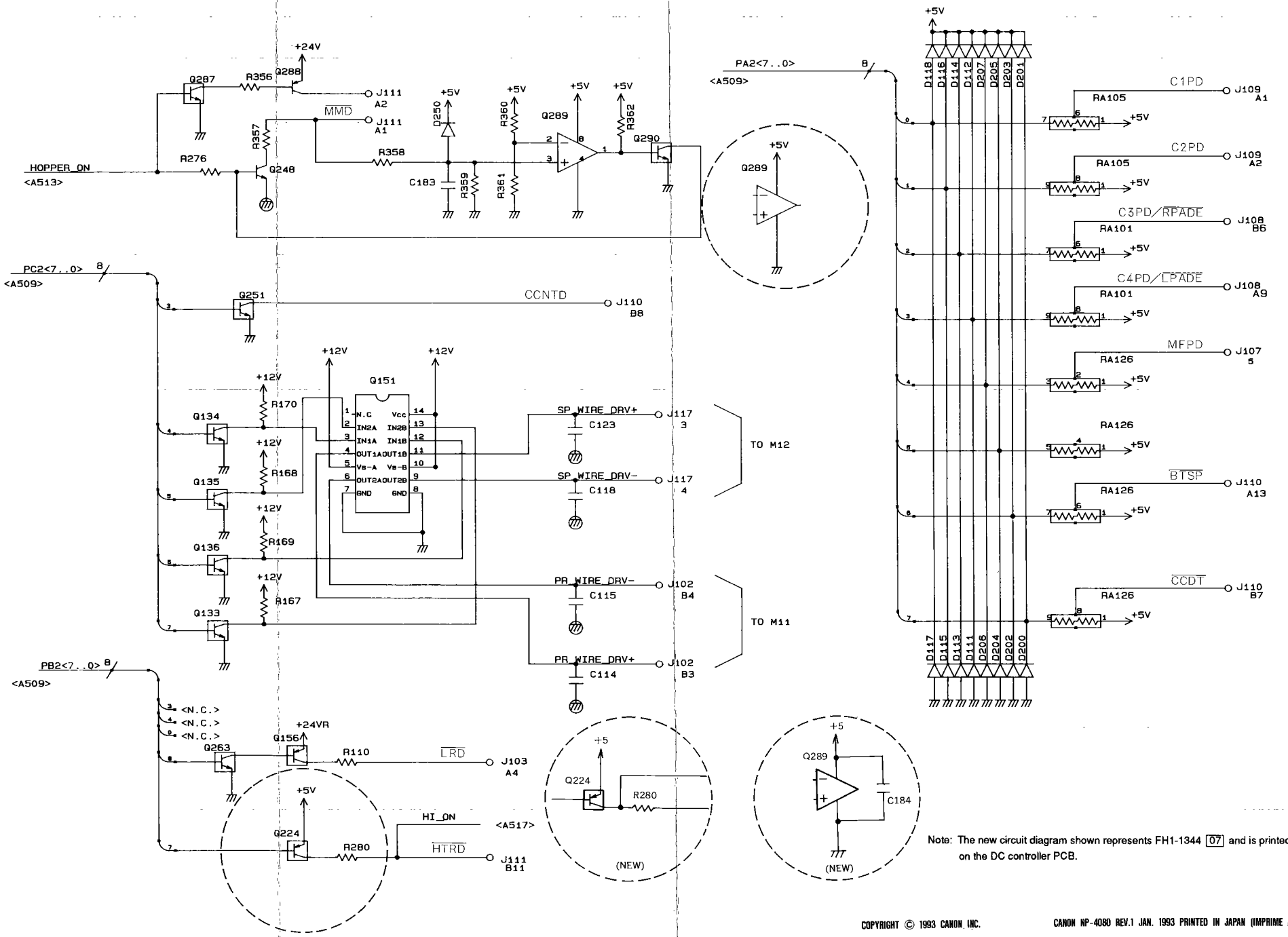
DC CONTROLLER CIRCUIT DIAGRAM (A514: EX2)



Note: The new circuit diagram shown represents FH1-1344 [07] and is printed on the DC controller PCB.

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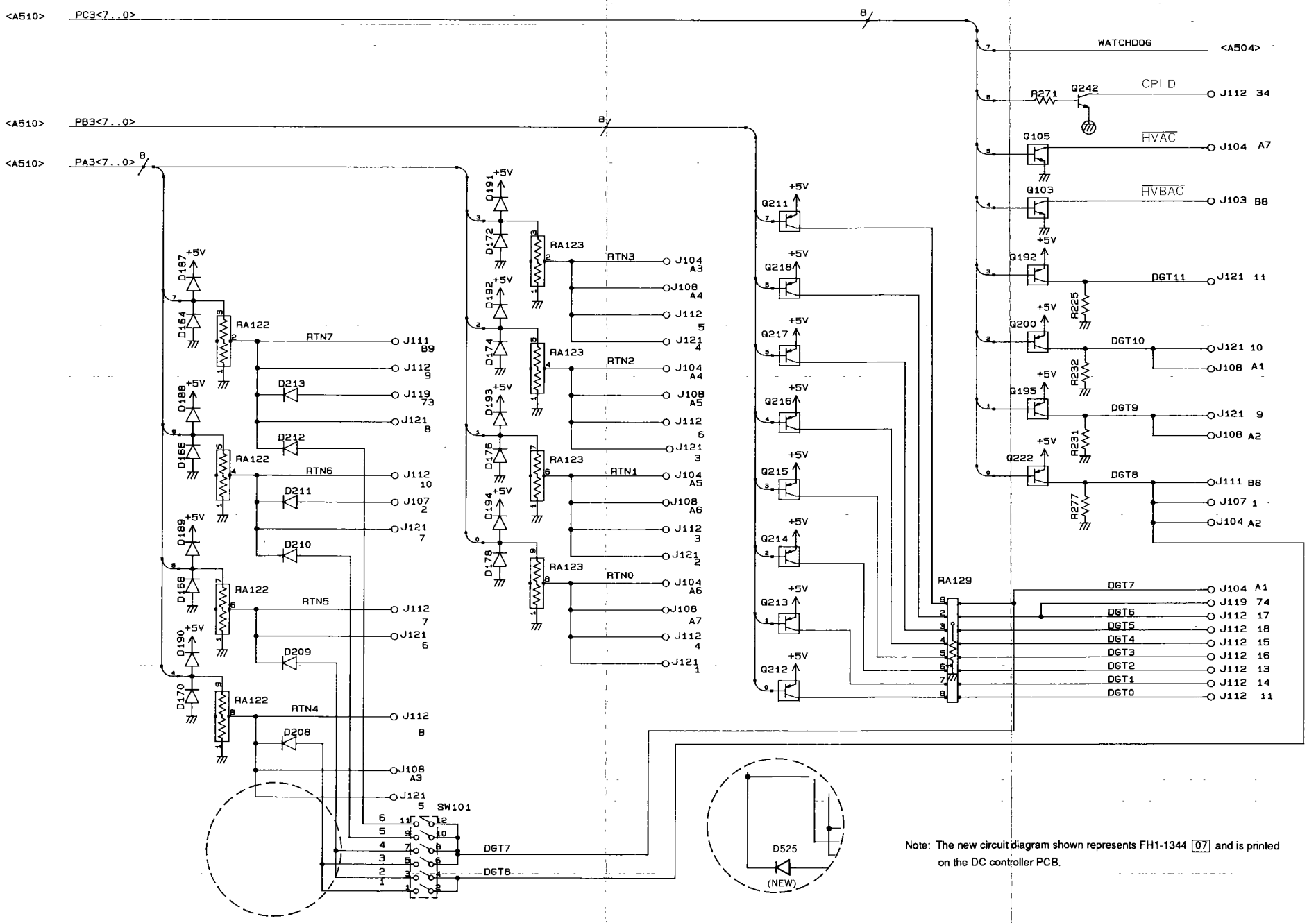

Note: The new circuit diagram shown represents FH1-1344 [07] and is printed on the DC controller PCB.

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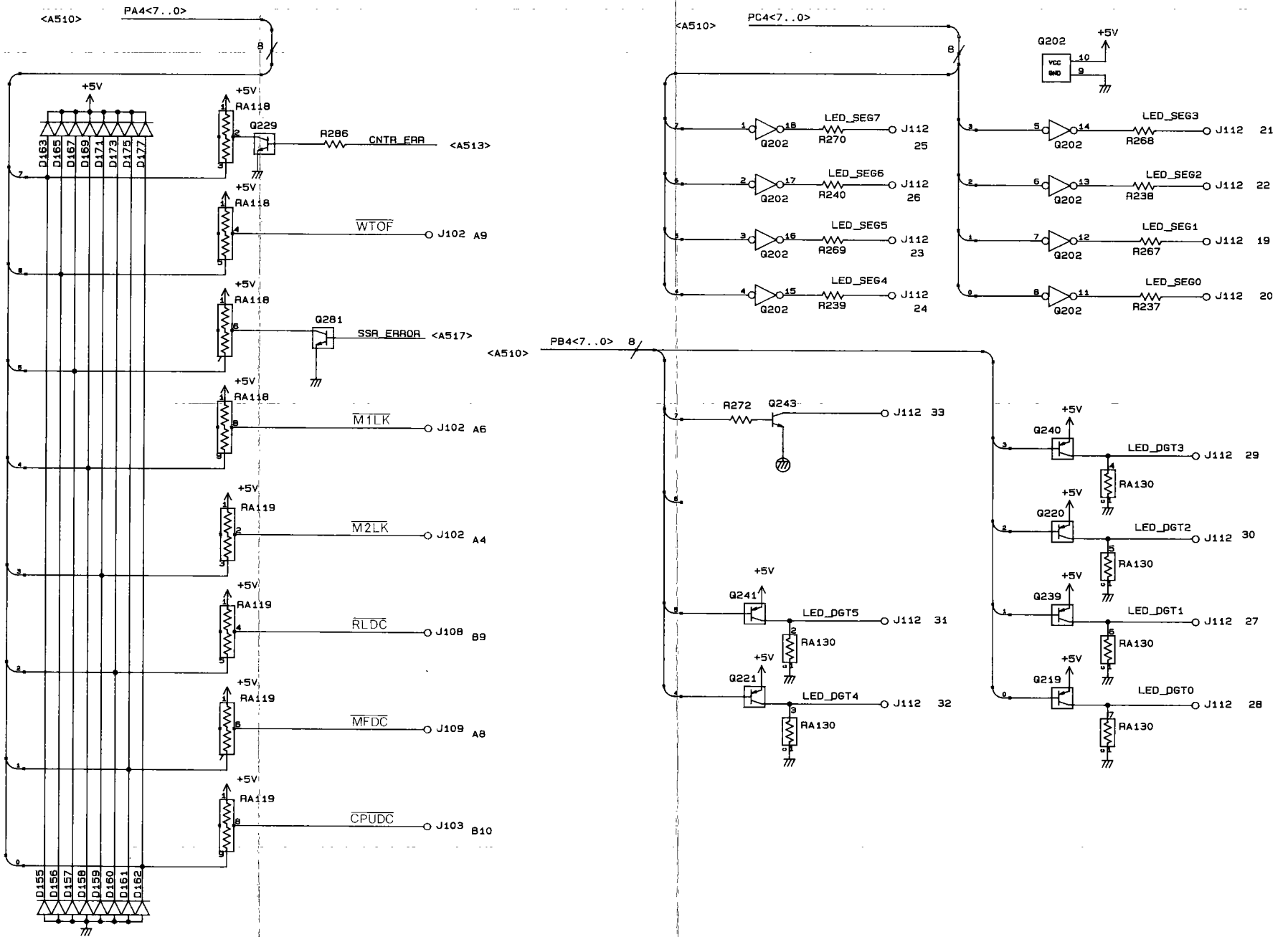
DC CONTROLLER CIRCUIT DIAGRAM (A516: EX4)



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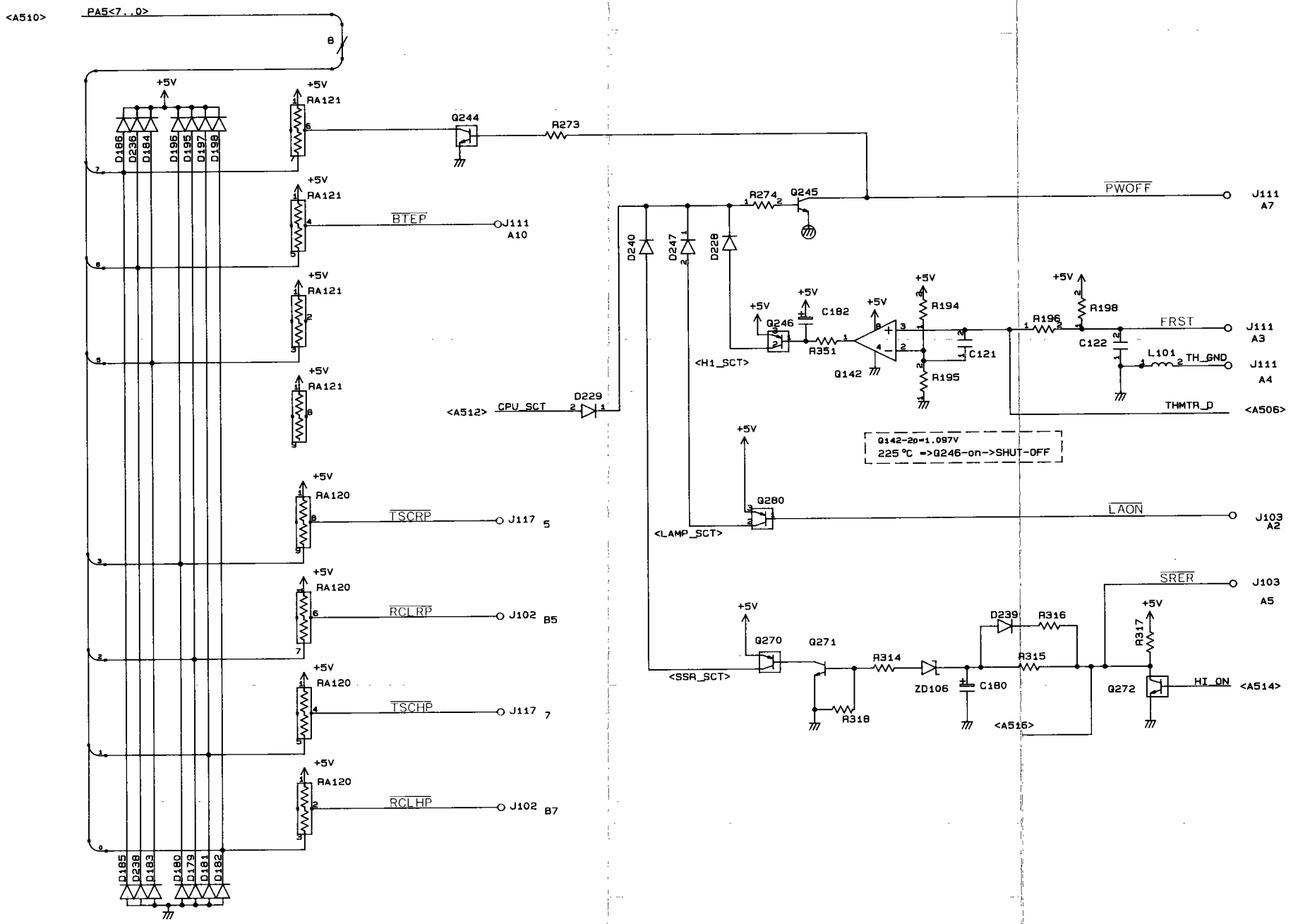

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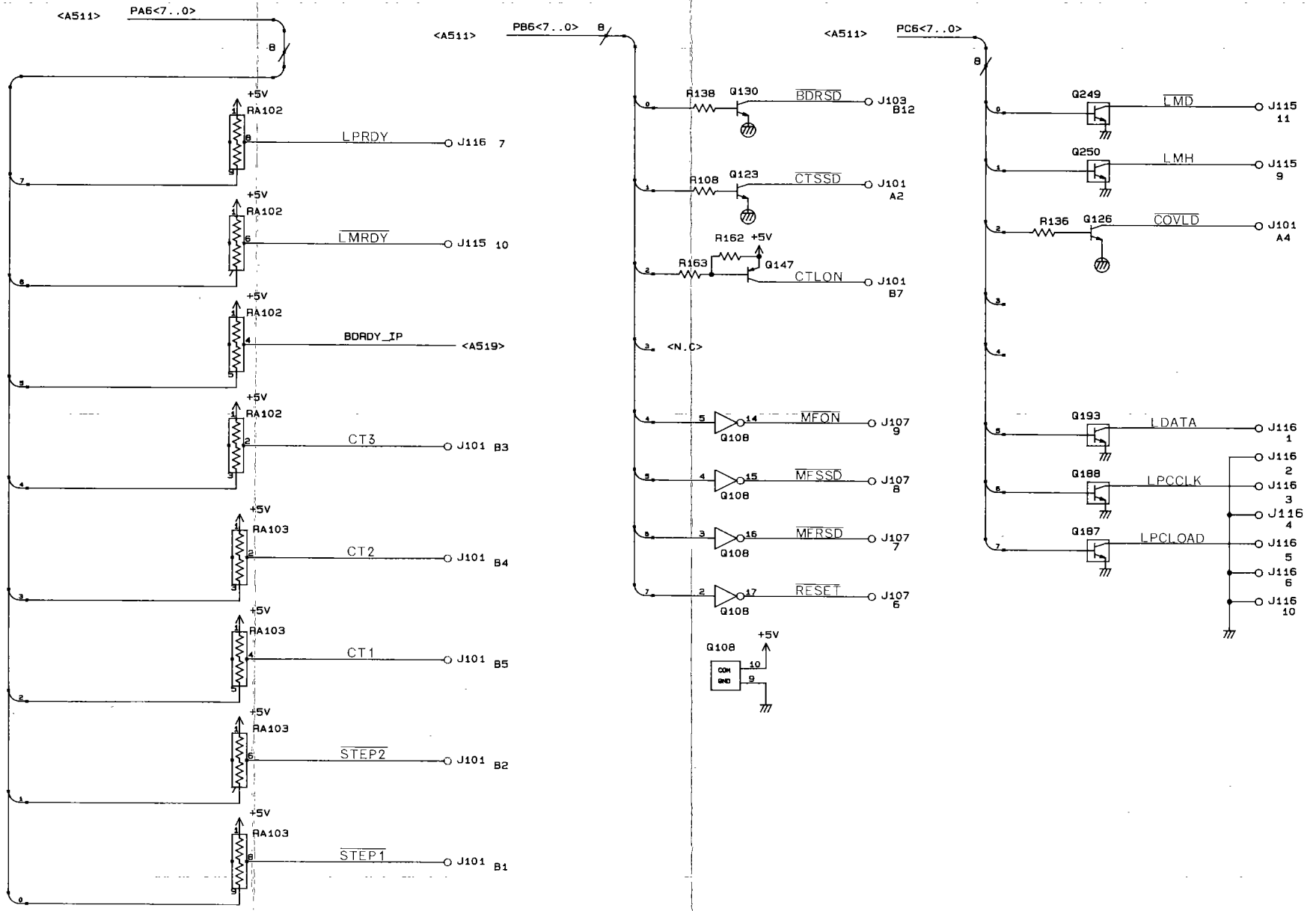

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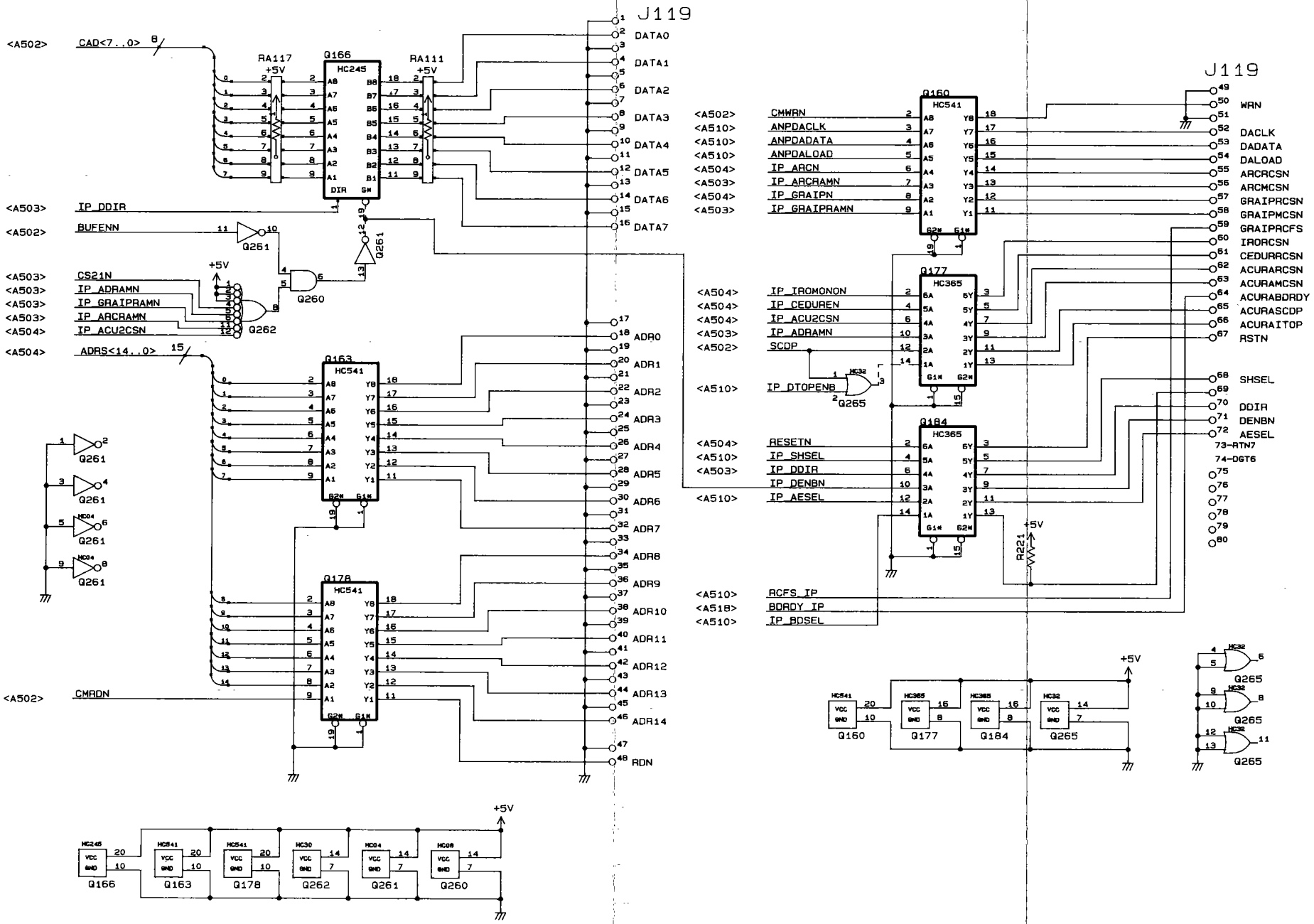

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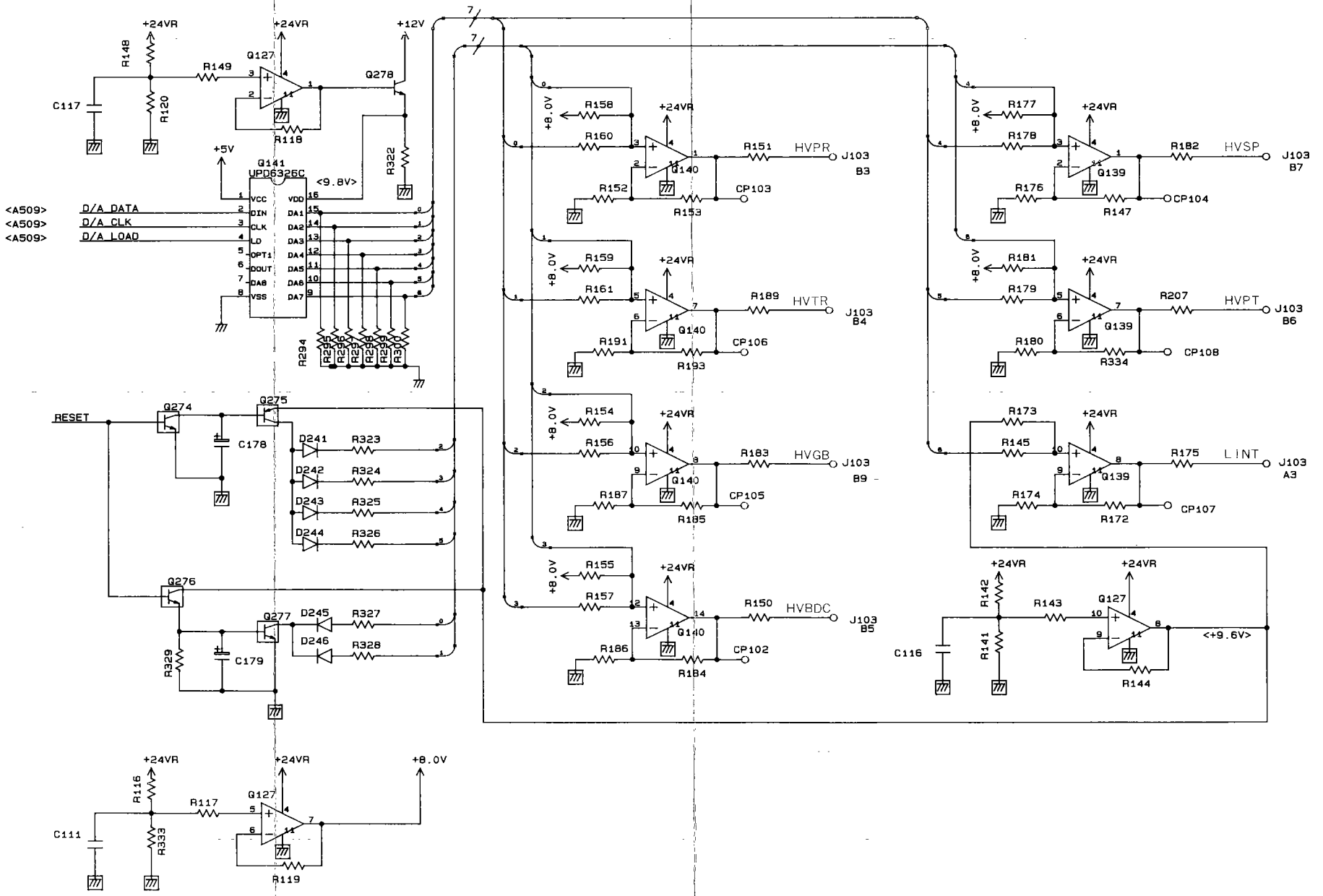
DC CONTROLLER CIRCUIT DIAGRAM (A520: analog signal for HV)



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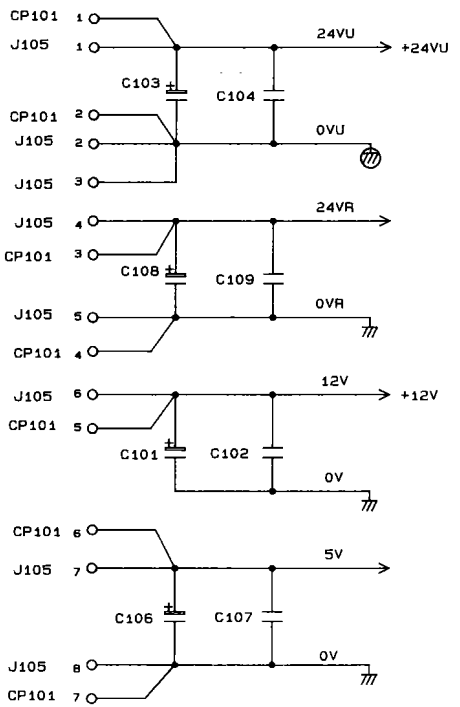
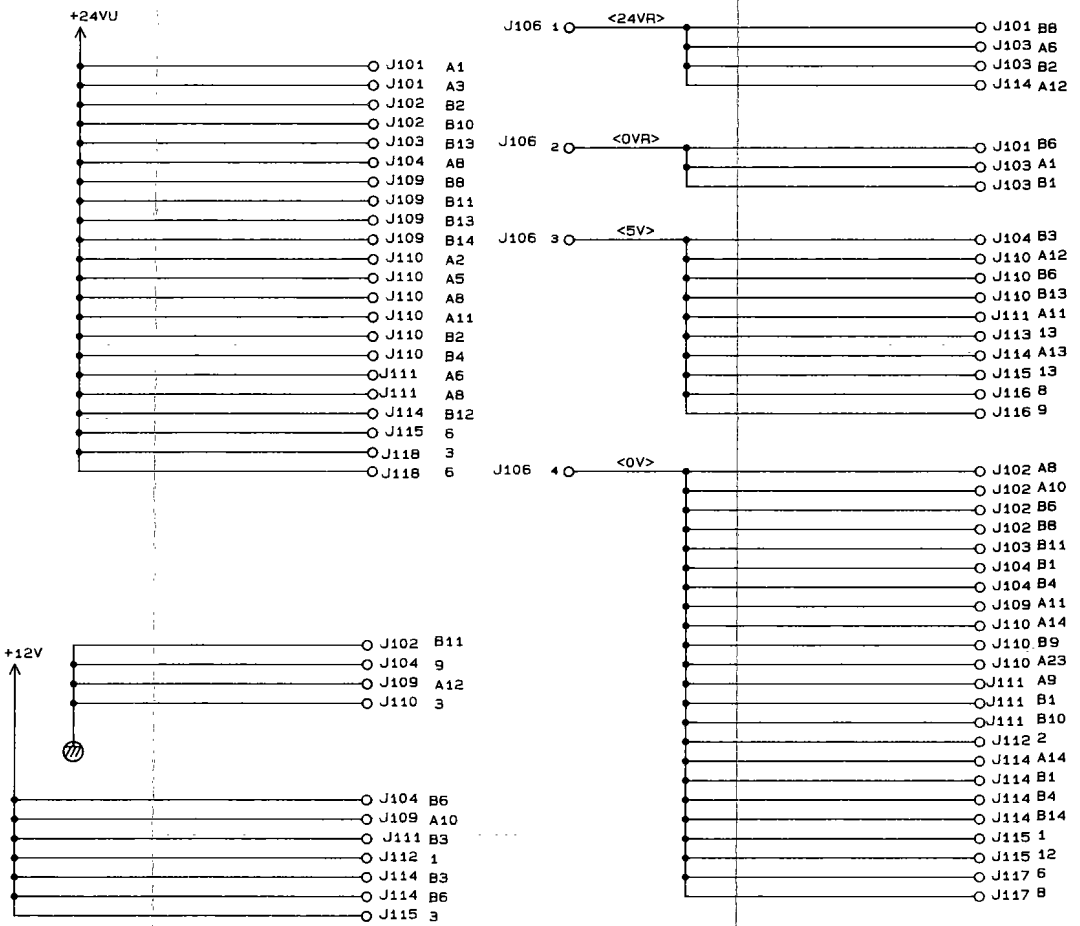
[P.C.B Power Line]



J101	A5	J114	B7
J101	A6	J114	B8
J101	A7	J114	B9
J101	A8	J114	B10
J102	B14	J114	B11
J103	A13		
J104	B9		
J112	12		
J113	1		
J113	2		

[N.C. Pin]

[Through Power Line]



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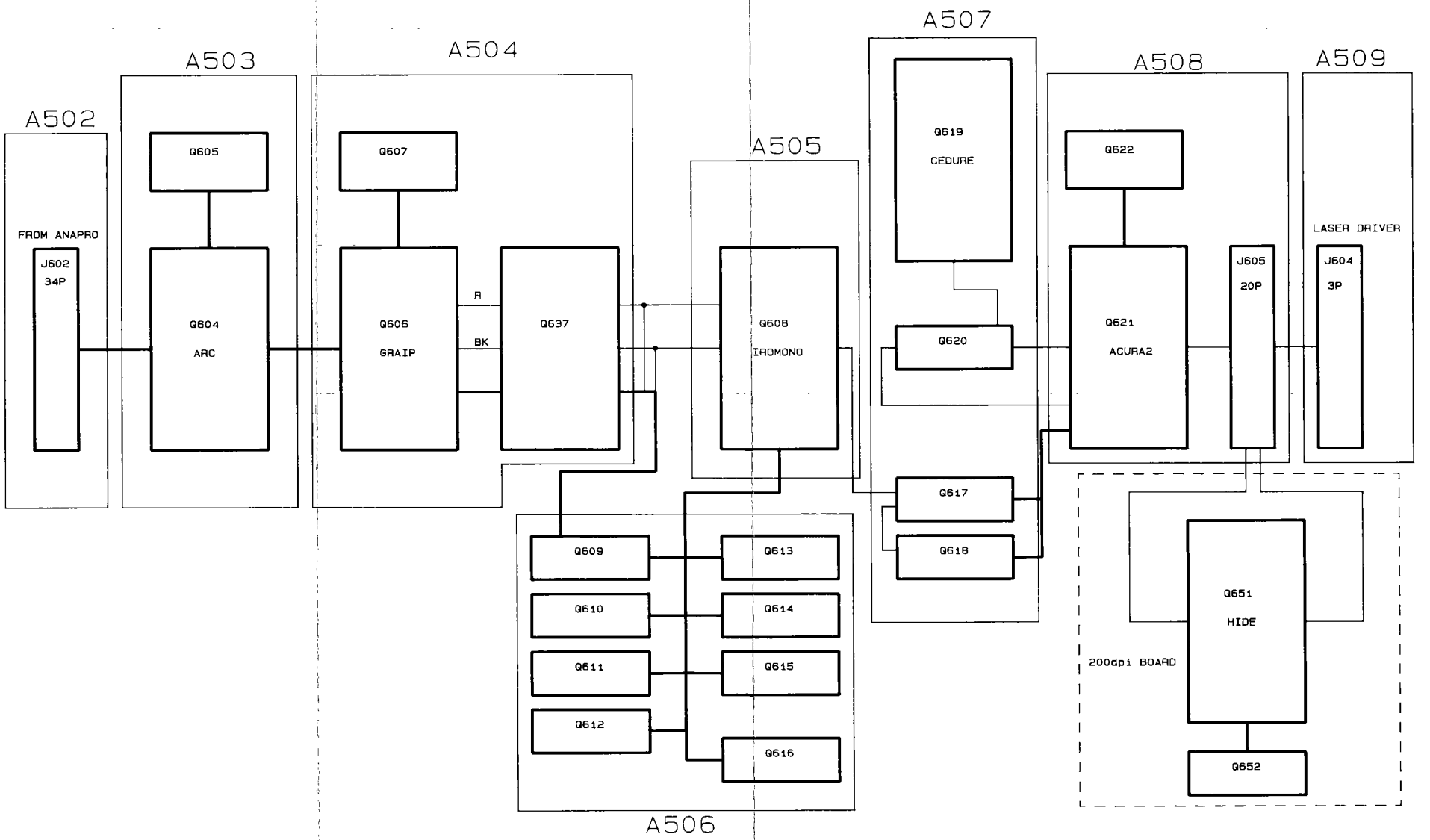
5. IMAGE PROCESSOR CIRCUIT DIAGRAM

IMAGE PROCESSOR CIRCUIT DIAGRAM (A501)



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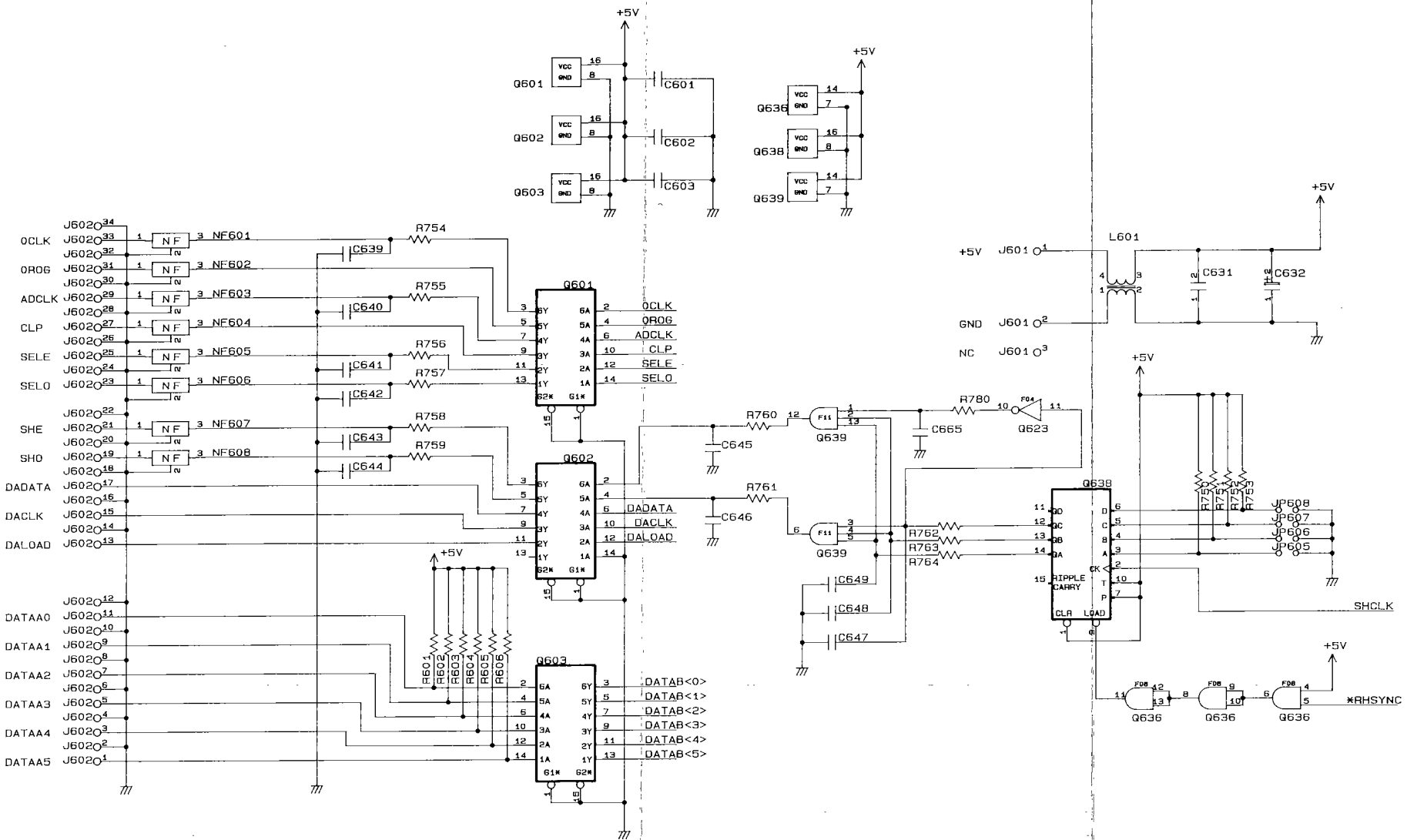
NEW



Note: The circuit diagram shown represents FH1-1345 [06] and is printed on the Image processor PCB.

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OLD

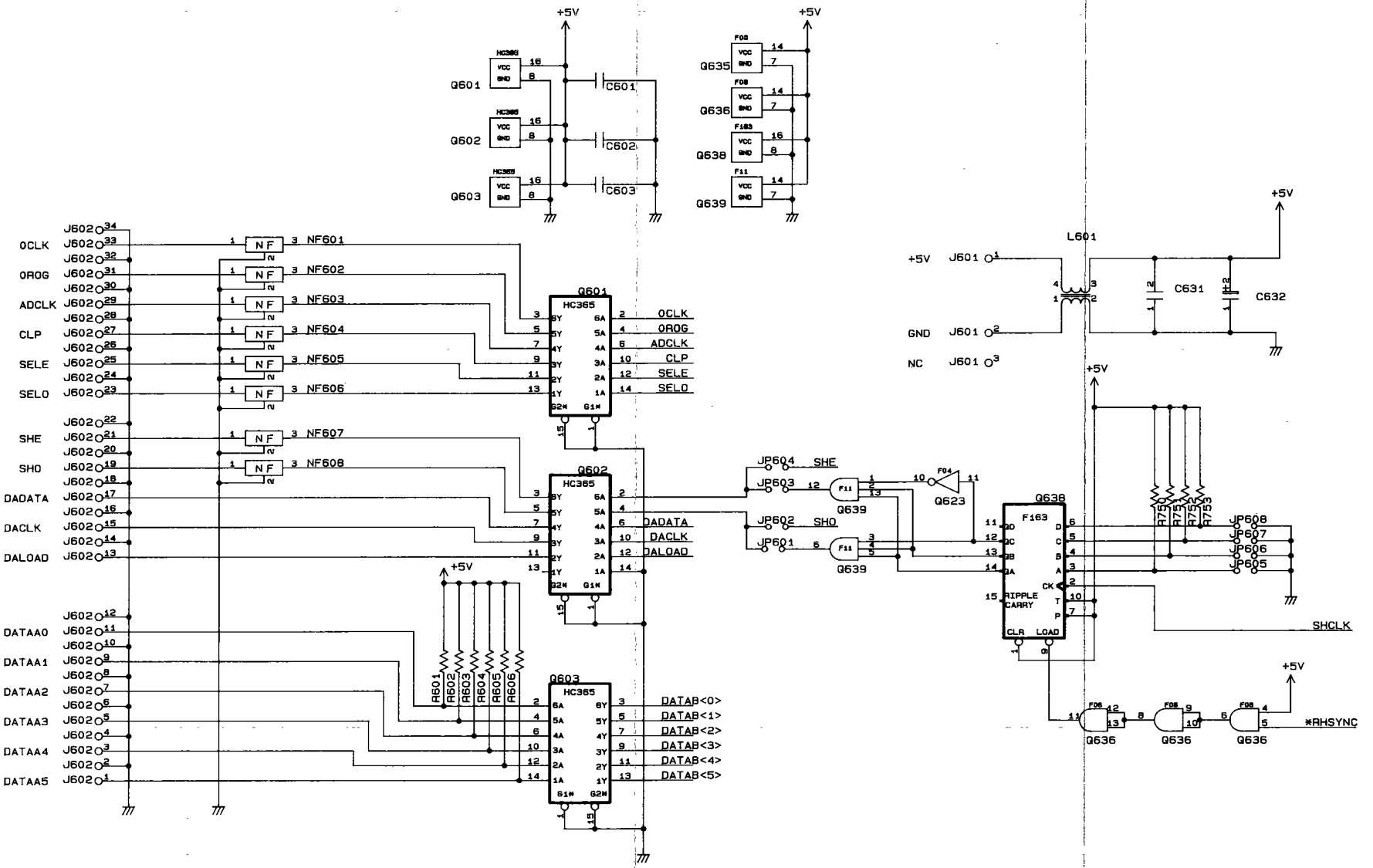

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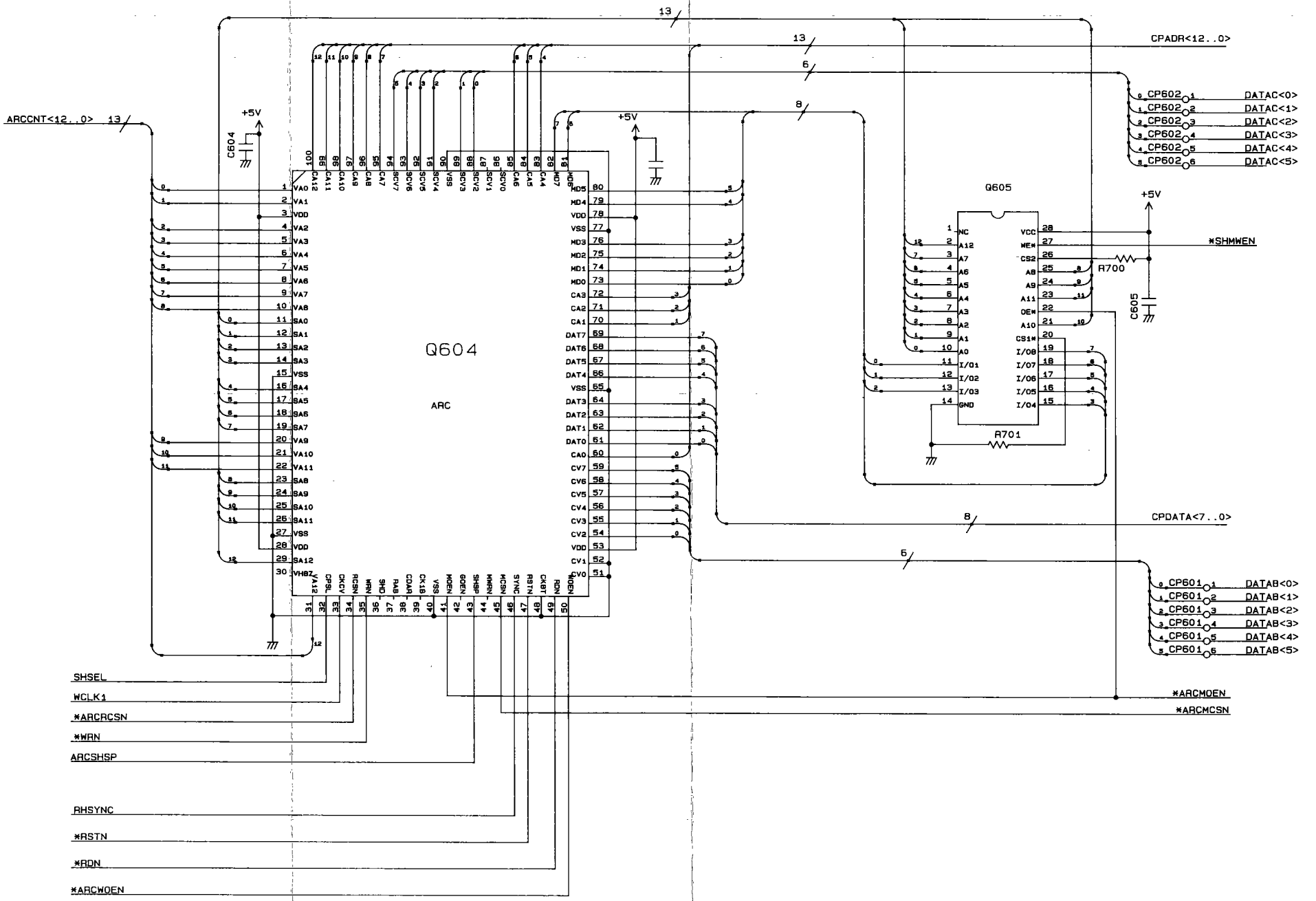
IMAGE PROCESSOR CIRCUIT DIAGRAM (A503)



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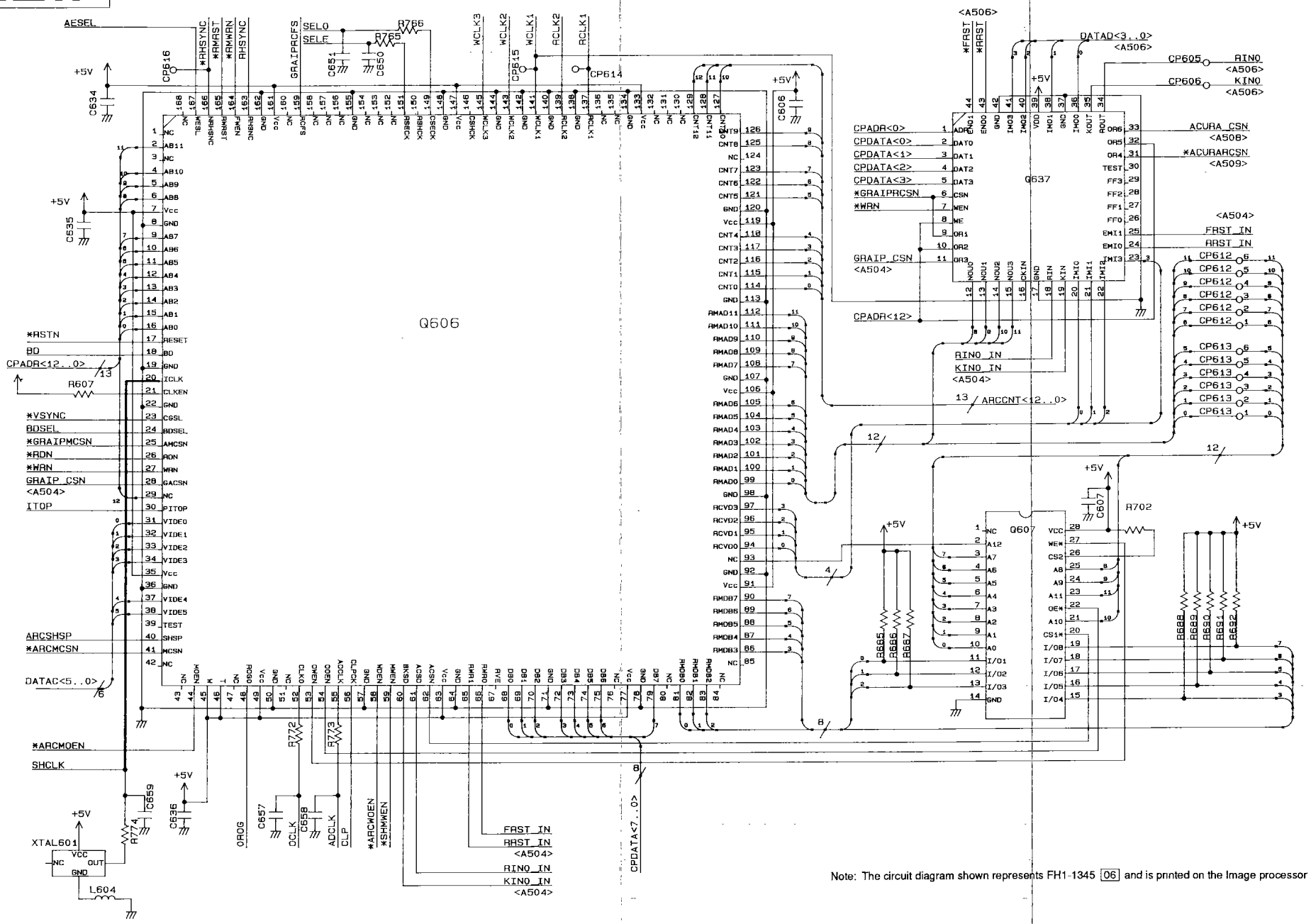
NEW



Note: The circuit diagram shown represents FH1-1345 [06] and is printed on the Image processor PCB.

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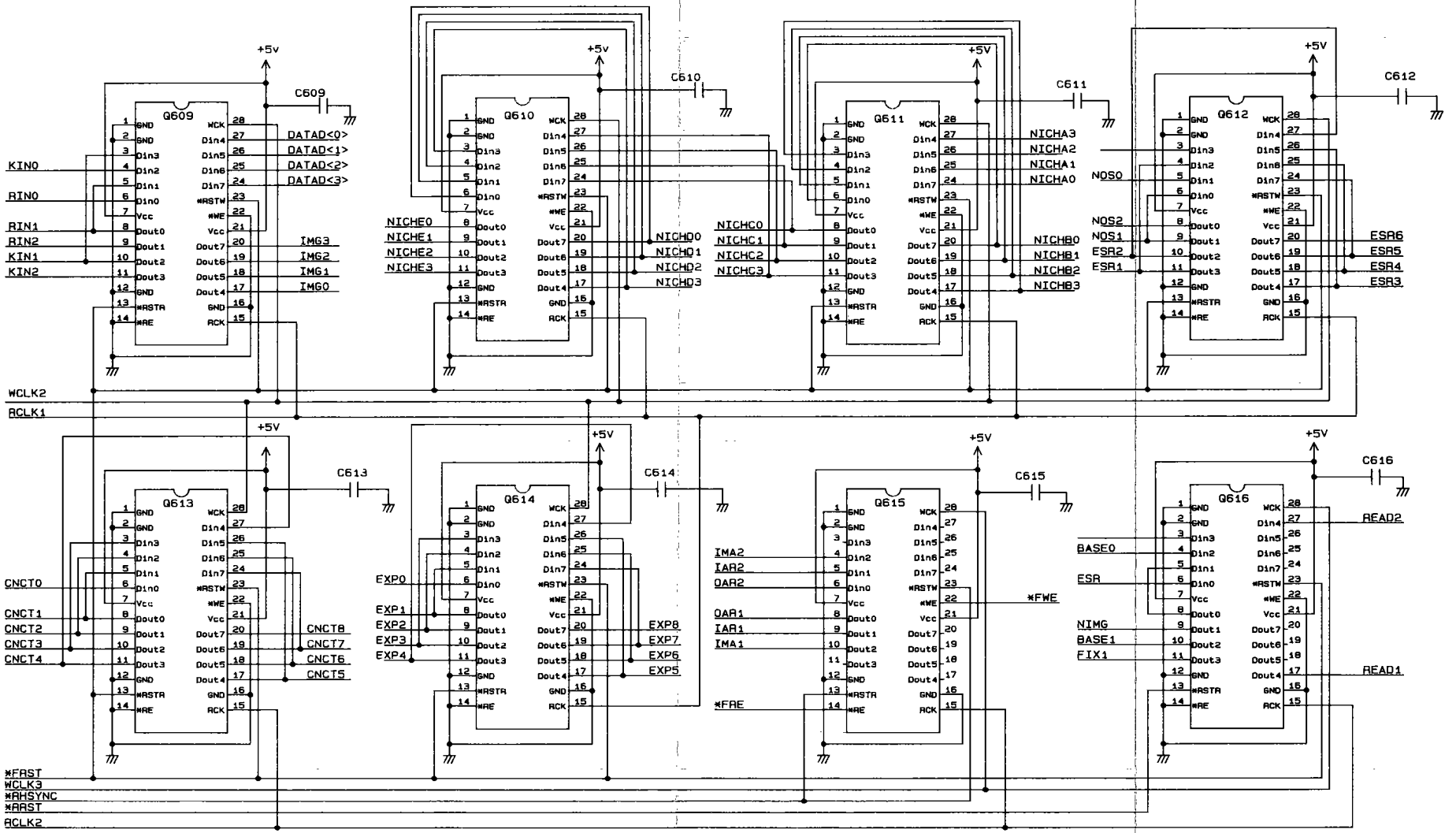

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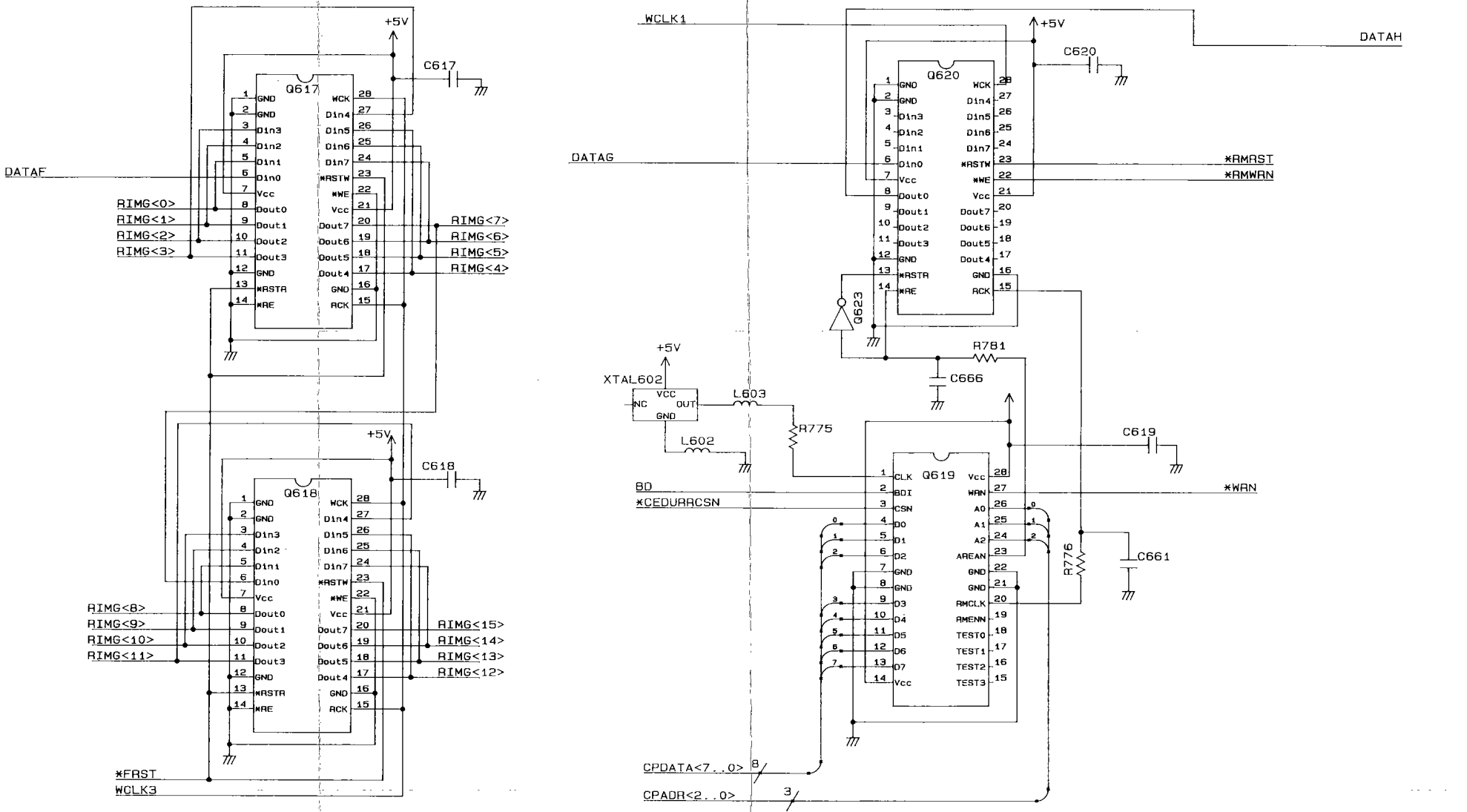
IMAGE PROCESSOR CIRCUIT DIAGRAM (A507)

NEW



Note: The circuit diagram shown represents FH1-1345 [06] and is printed on the Image processor PCB.

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OLD

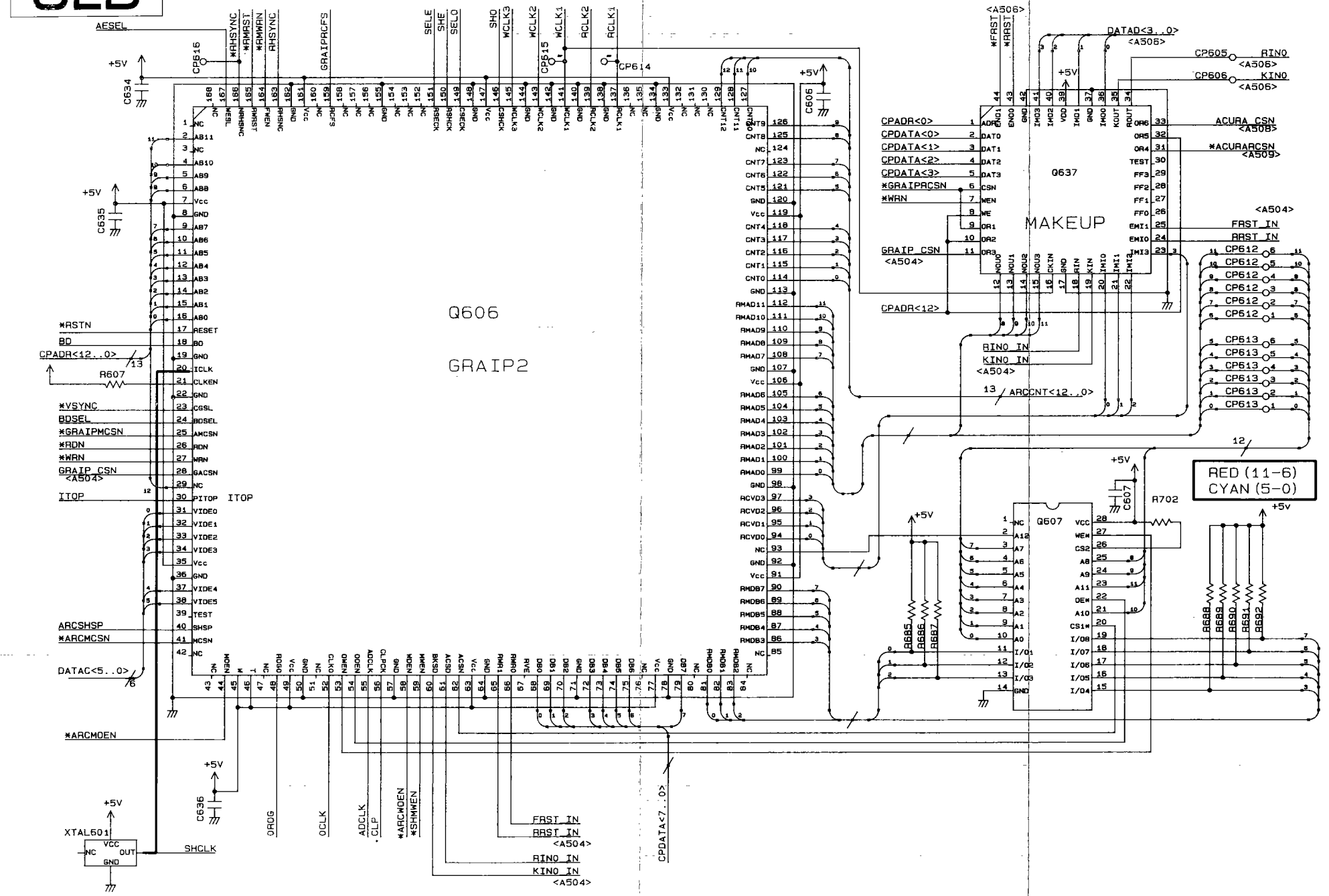

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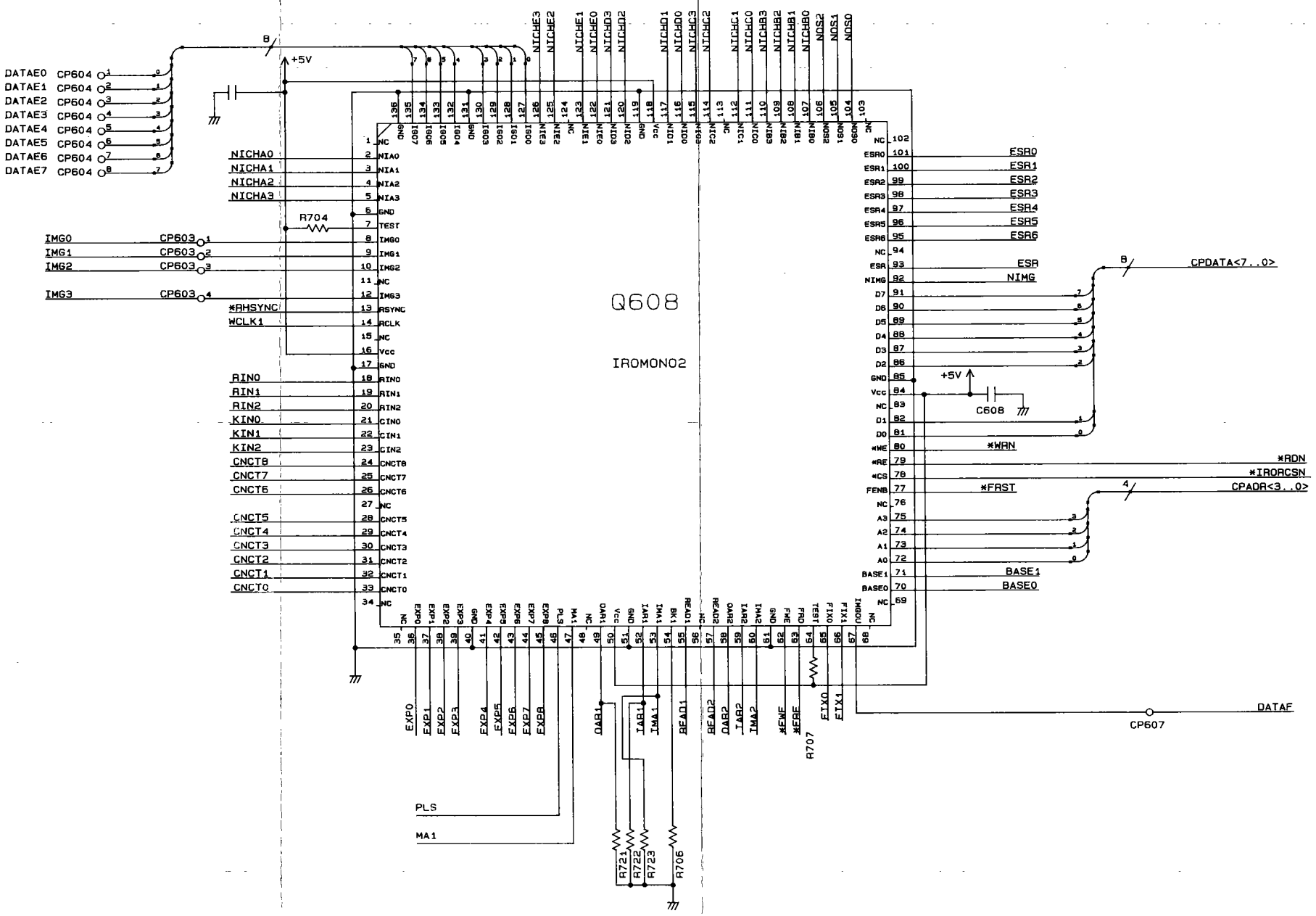
IMAGE PROCESSOR CIRCUIT DIAGRAM (A505)



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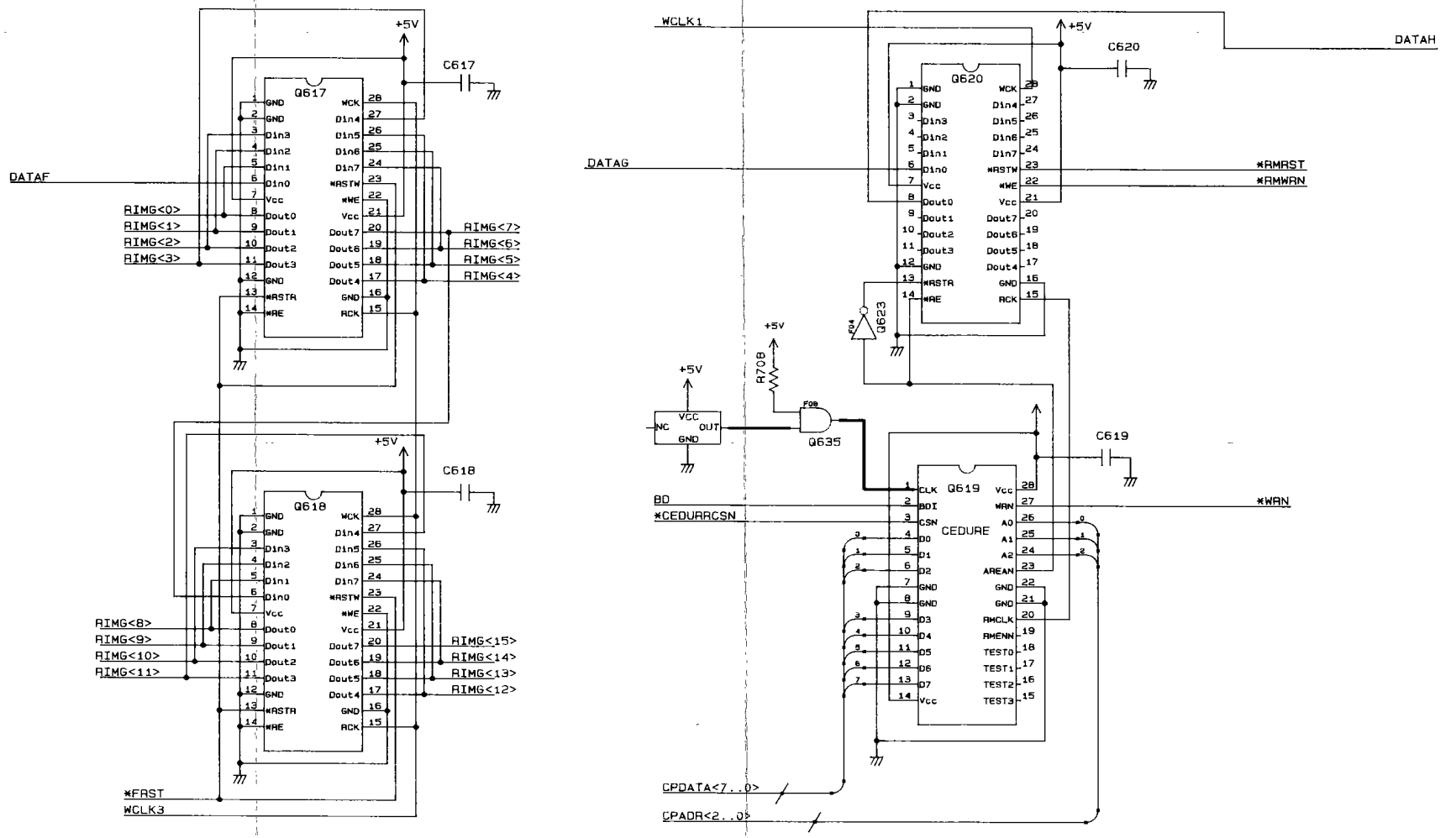
OLD



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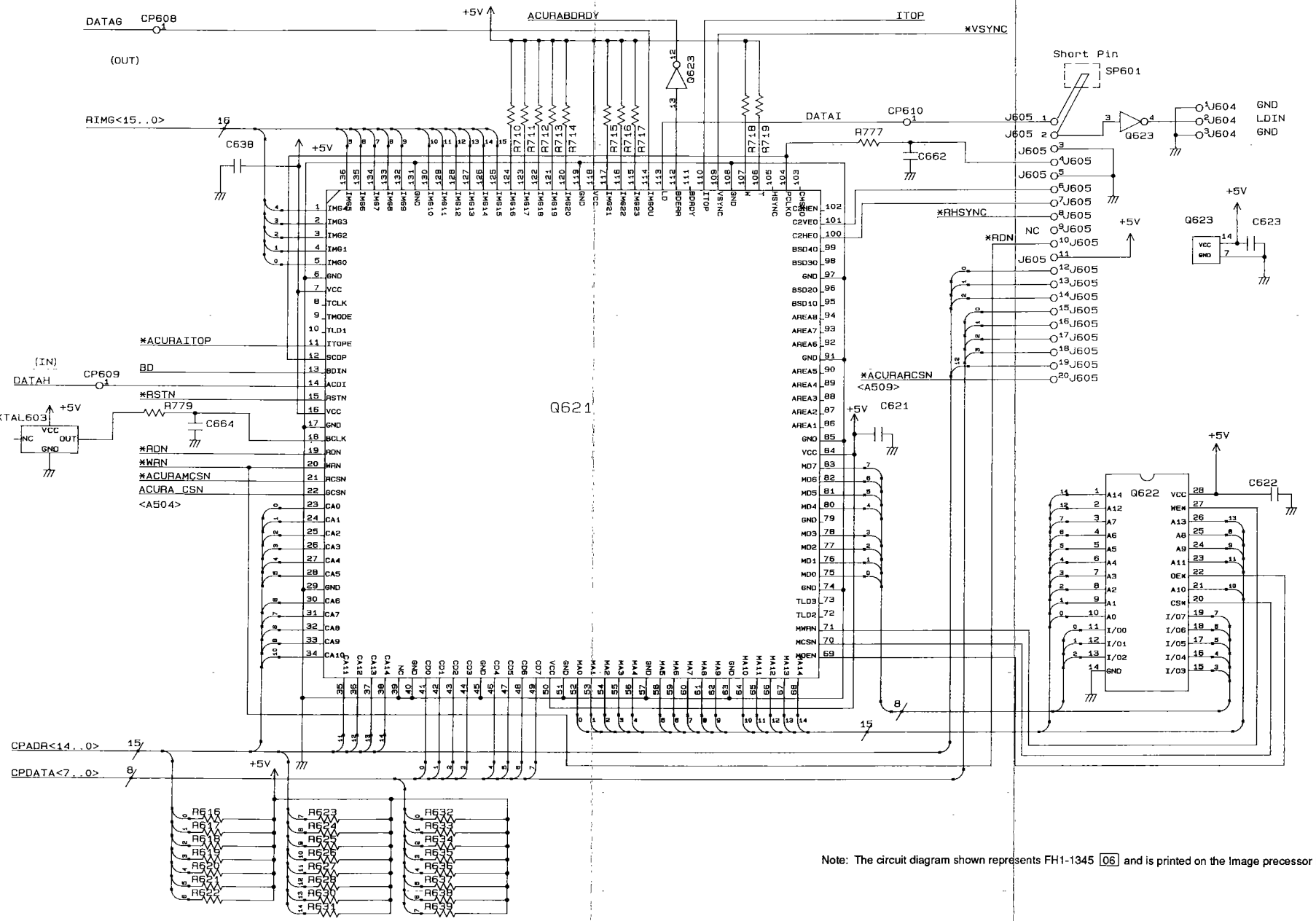
NEW



Note: The circuit diagram shown represents FH1-1345 [06] and is printed on the Image precessor PCB.

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OLD

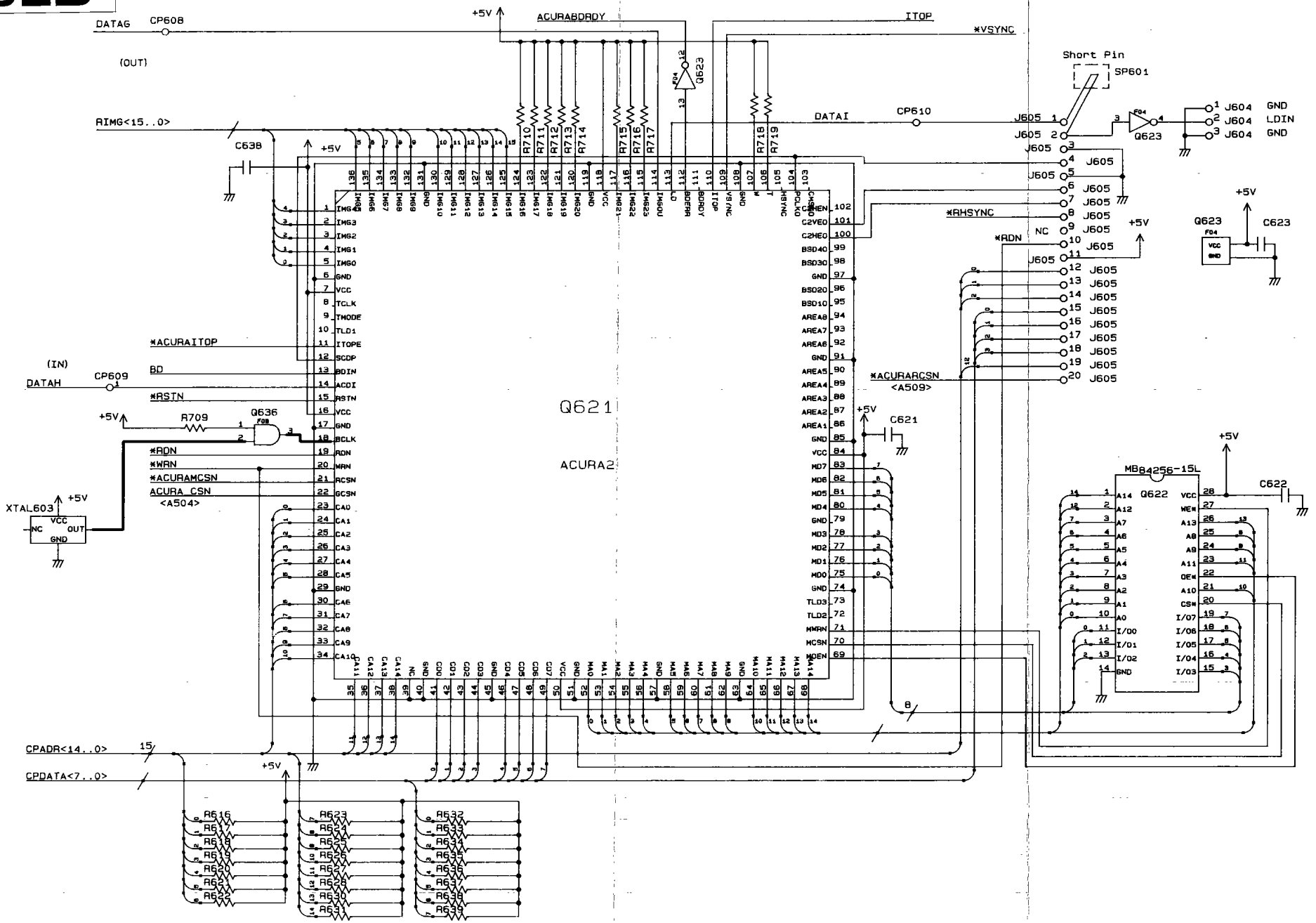

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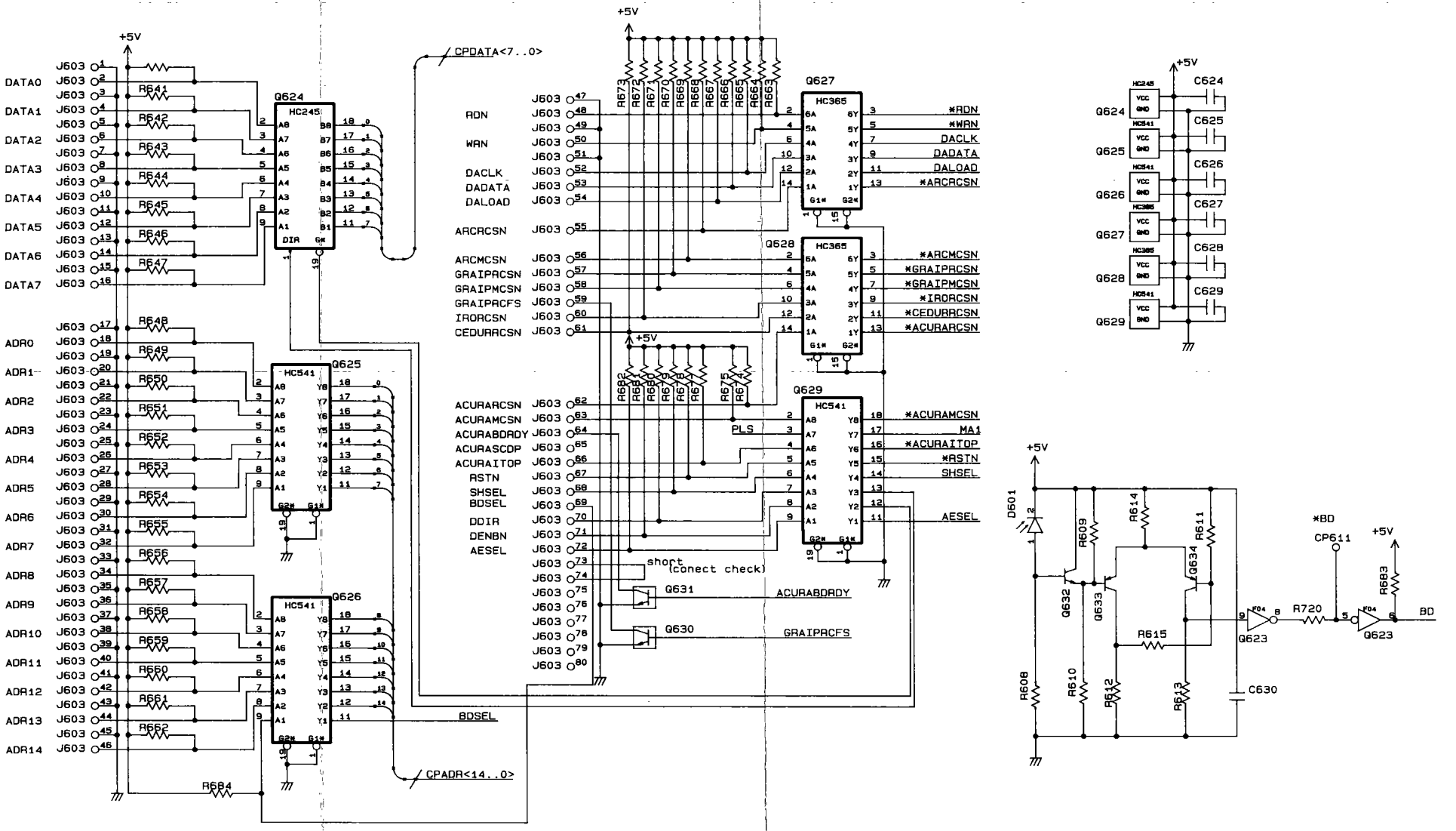
IMAGE PROCESSOR CIRCUIT DIAGRAM (A509)



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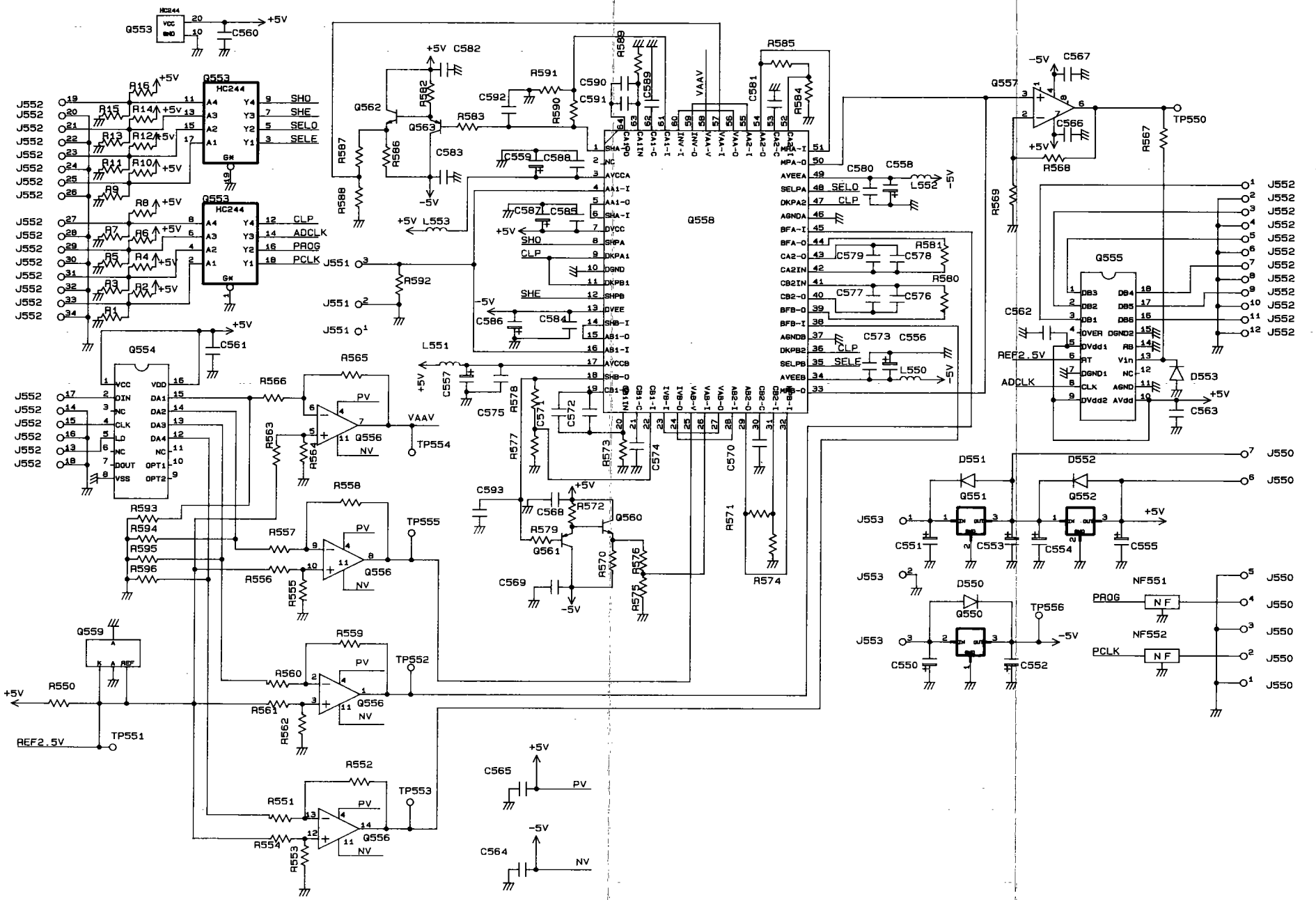

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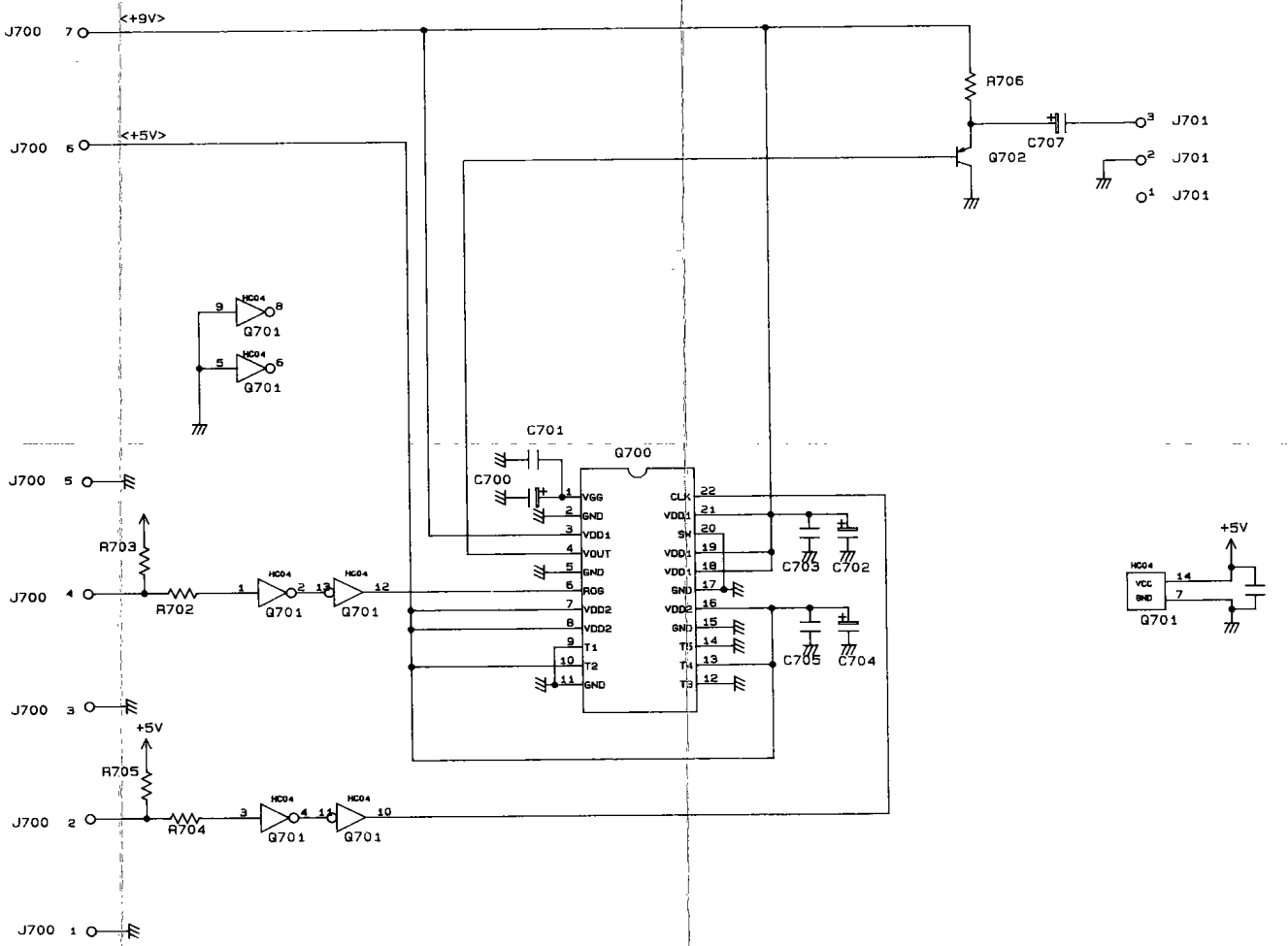
7. CCD DRIVER CIRCUIT DIAGRAM



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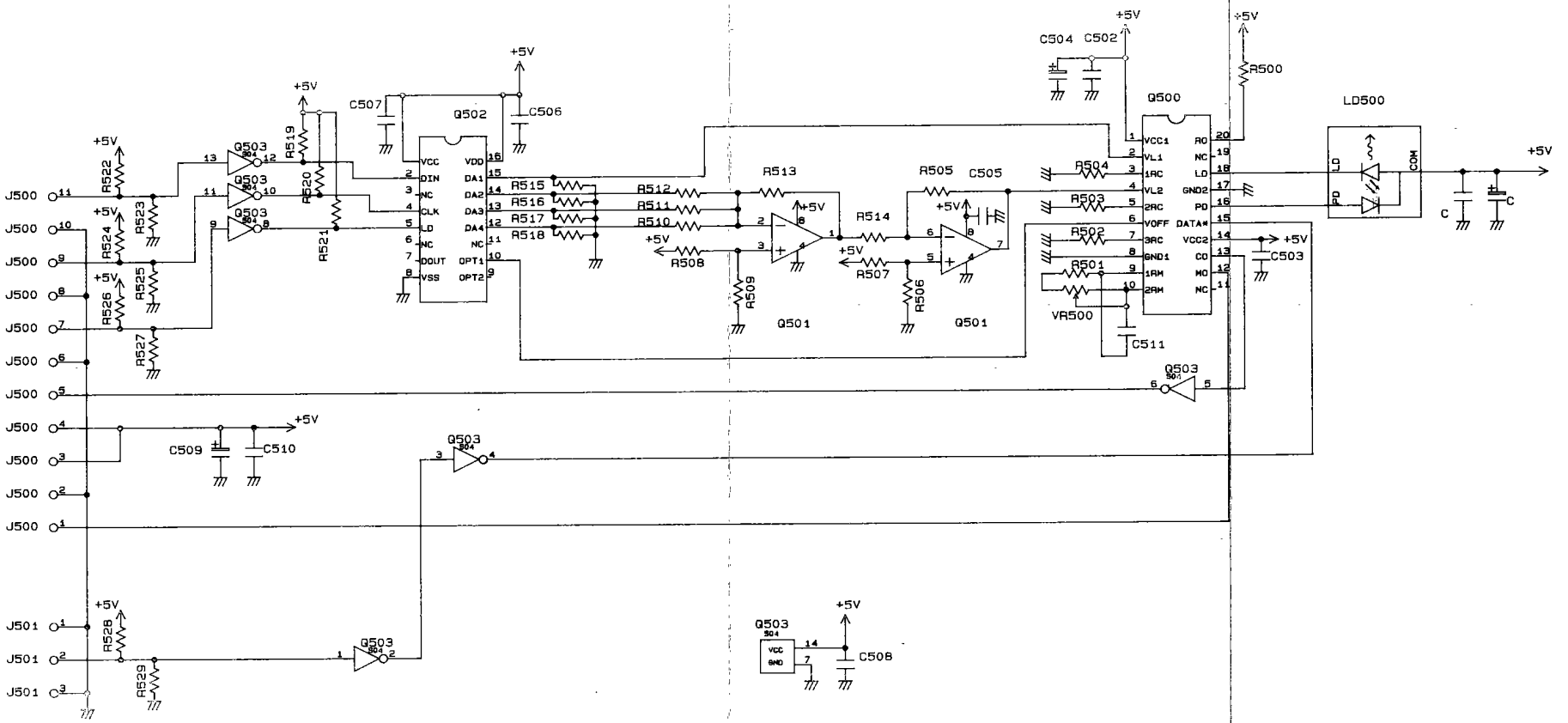

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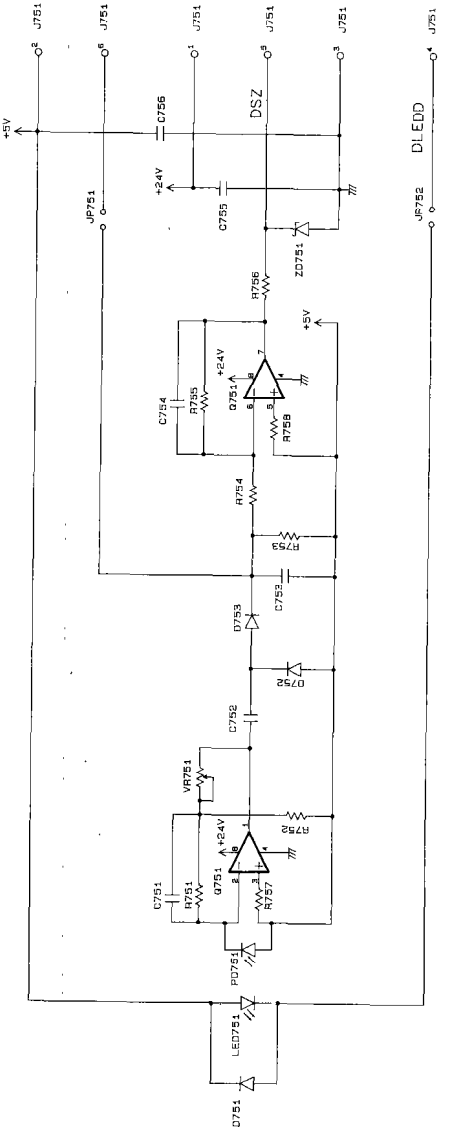
9. DOCUMENT SIZE DETECTION CIRCUIT DIAGRAM

NEW

Note: The circuit diagram shown represents FH1-1348, 1349 [02] and is printed on the document size detection PCB.



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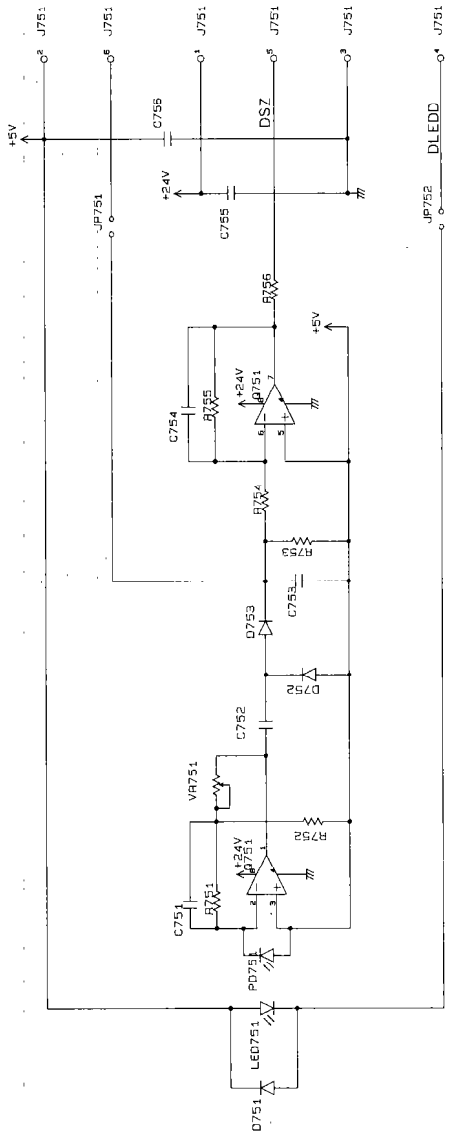
OLD



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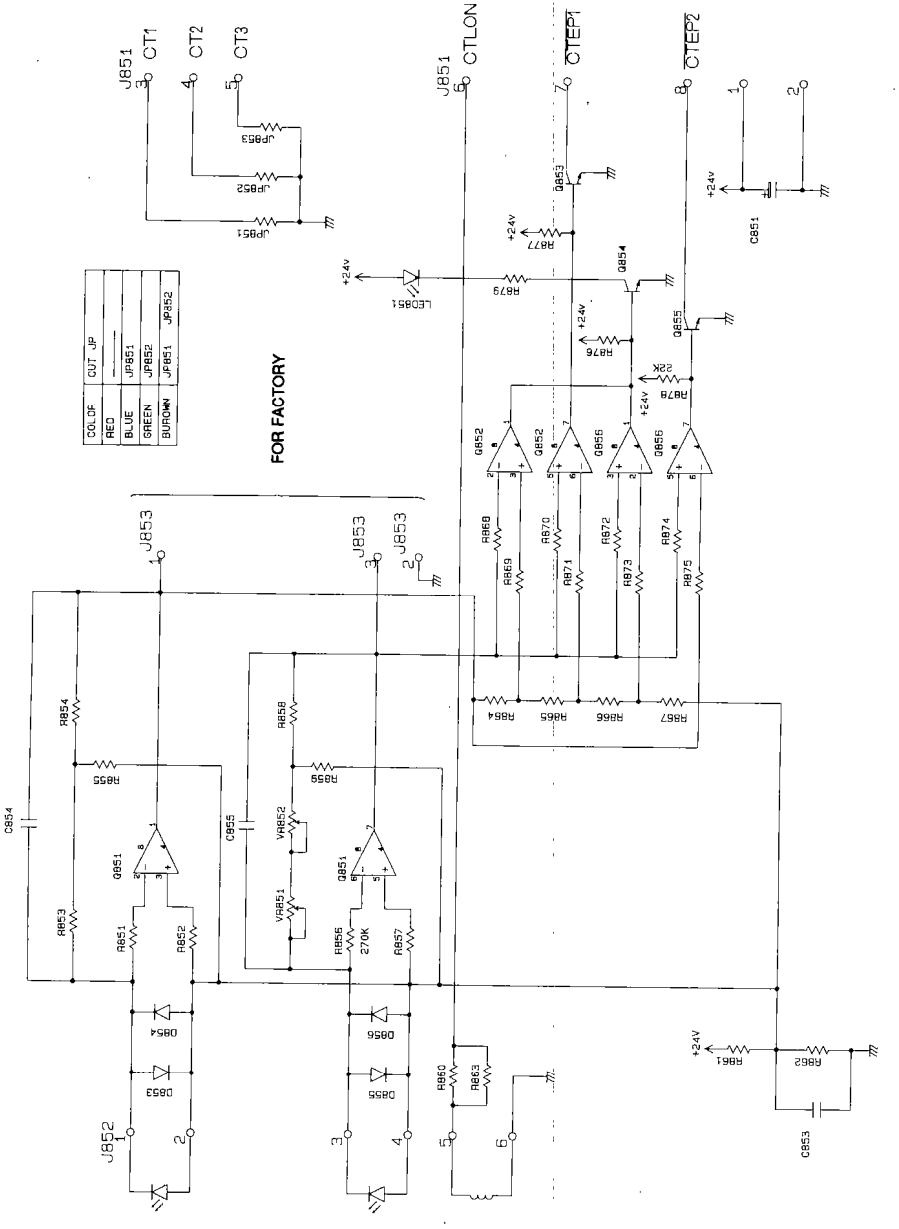
10. COLOR TONER CONCENTRATION DETECTION CIRCUIT DIAGRAM



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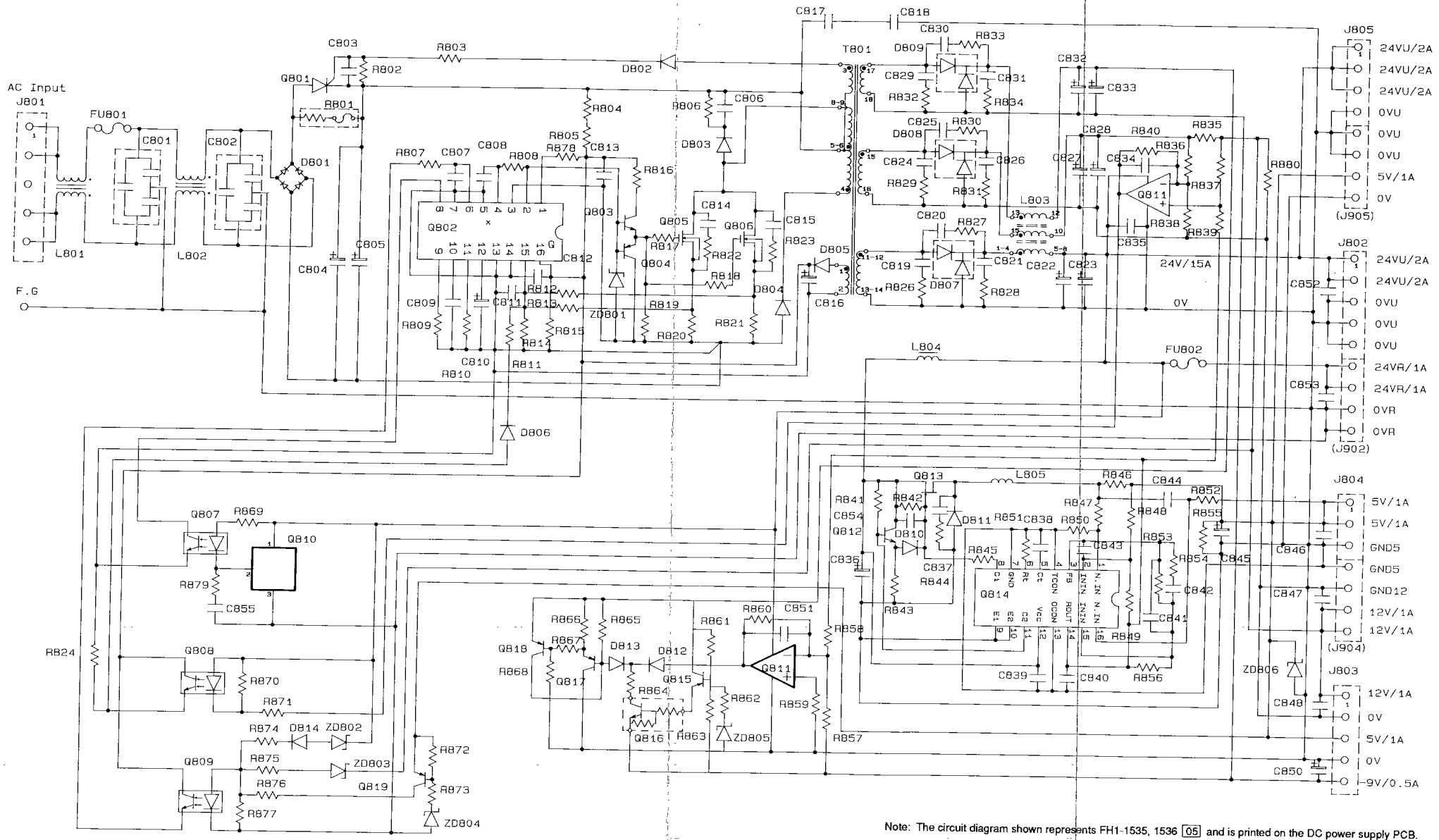
NEW



Note: The circuit diagram shown represents FH1-1535, 1536 [05] and is printed on the DC power supply PCB.

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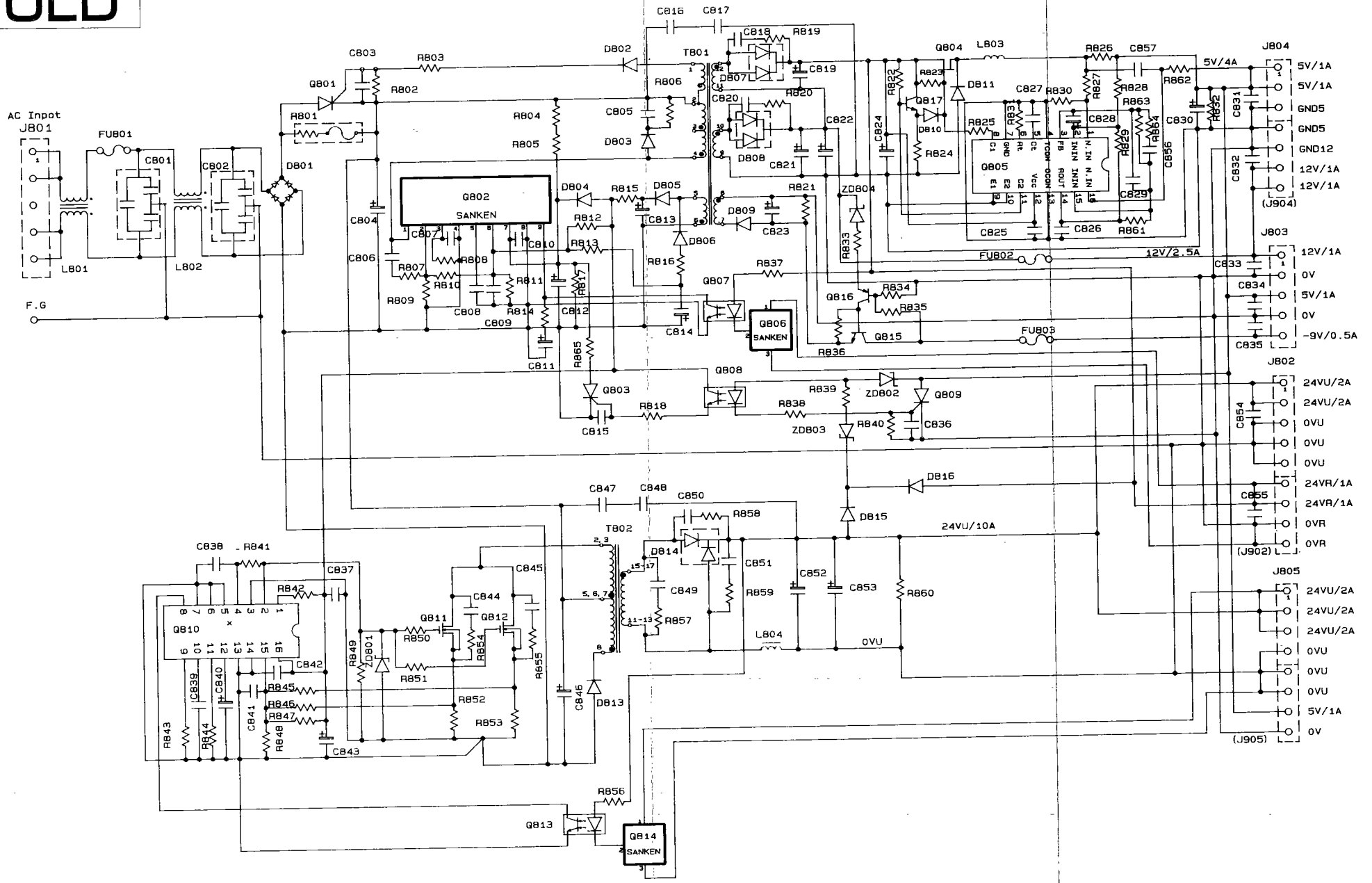
OLD



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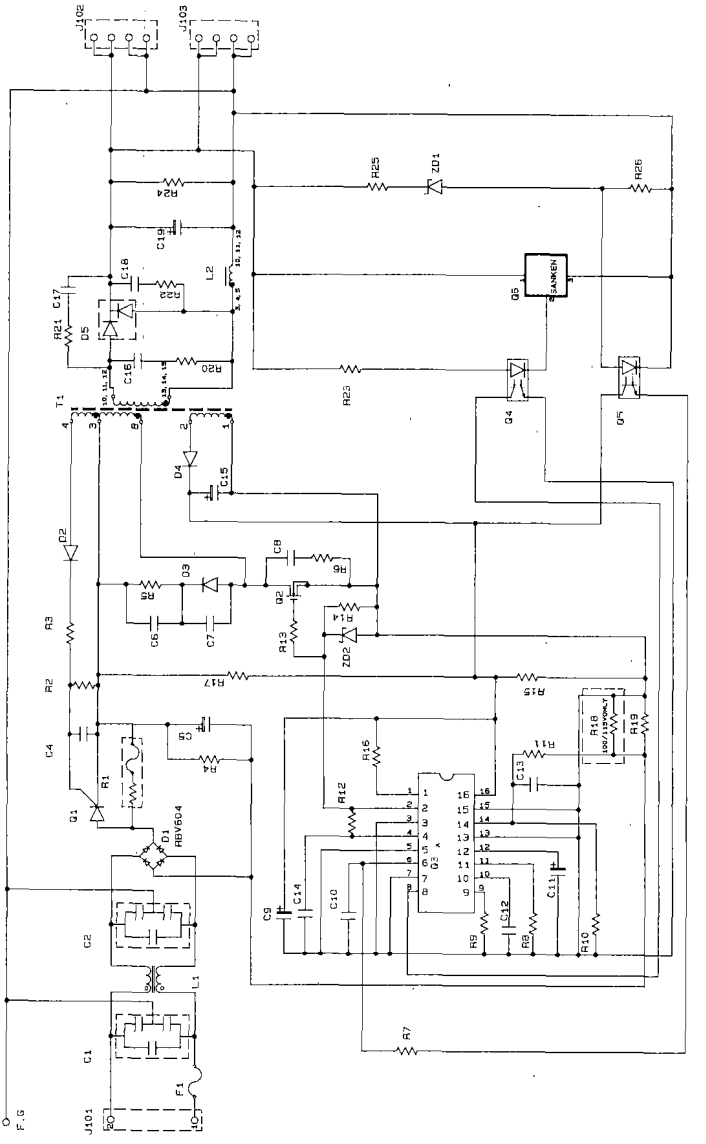
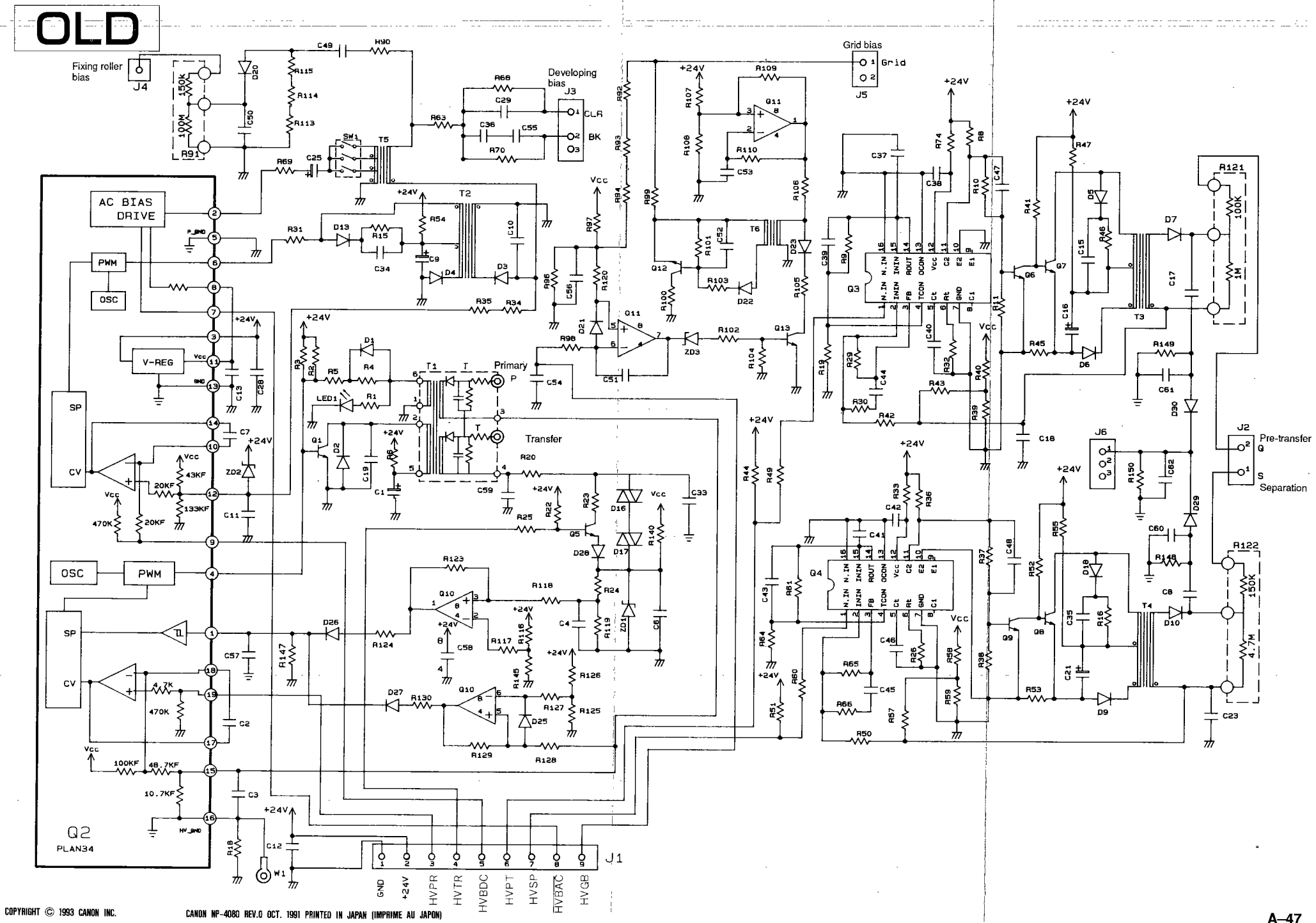
12. DC POWER SUPPLY DIAGRAM FOR DF/SORTER





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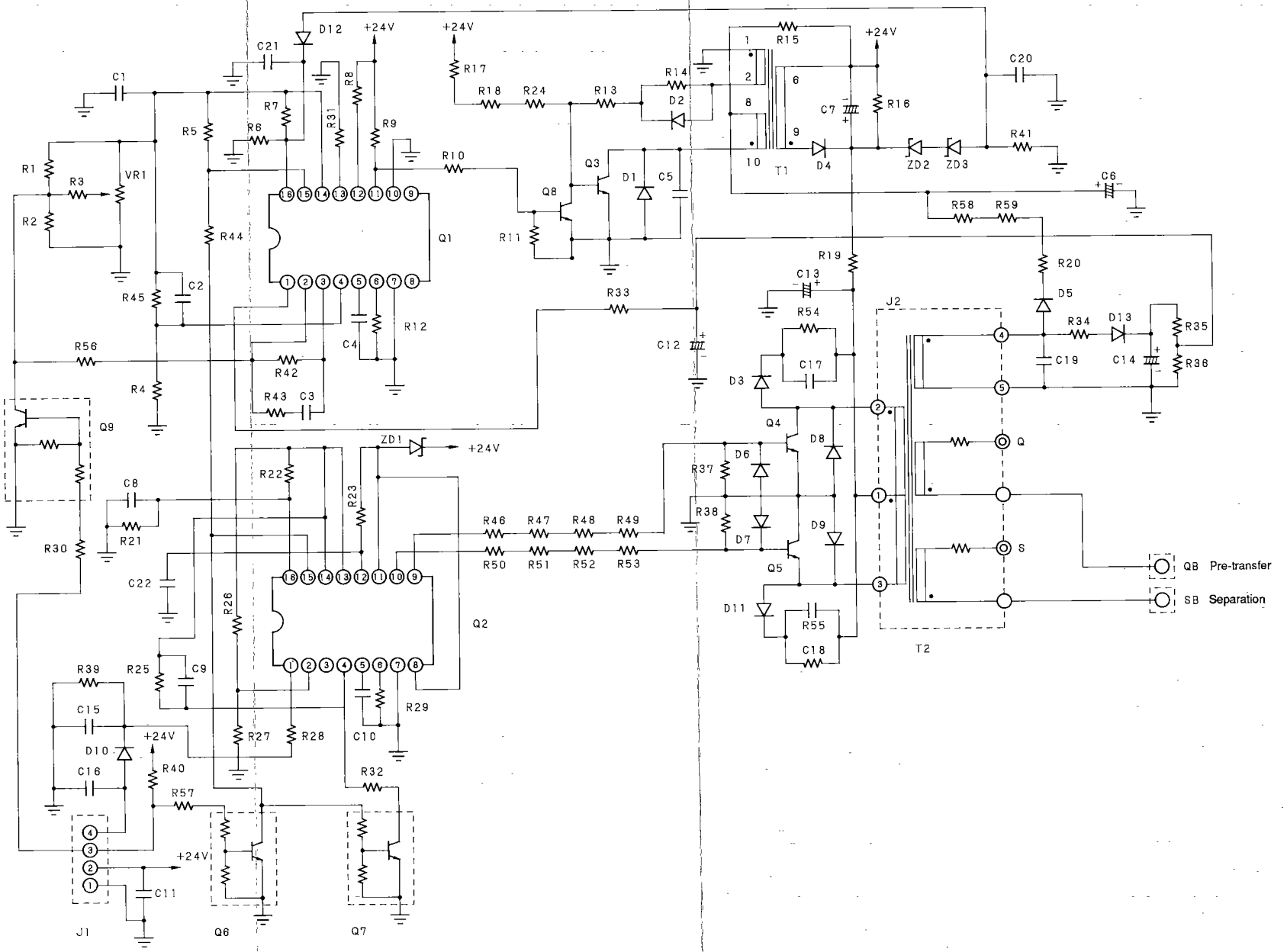
14. HVTAC CIRCUIT DIAGRAM



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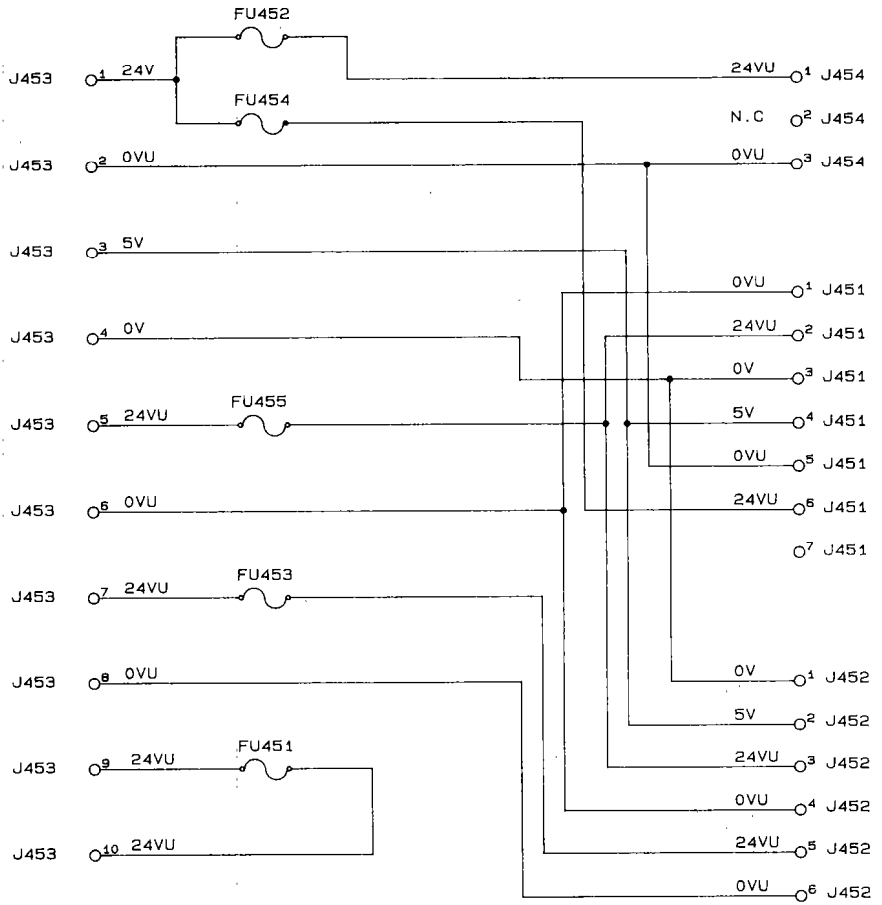
15. FUSE CIRCUIT DIAGRAM



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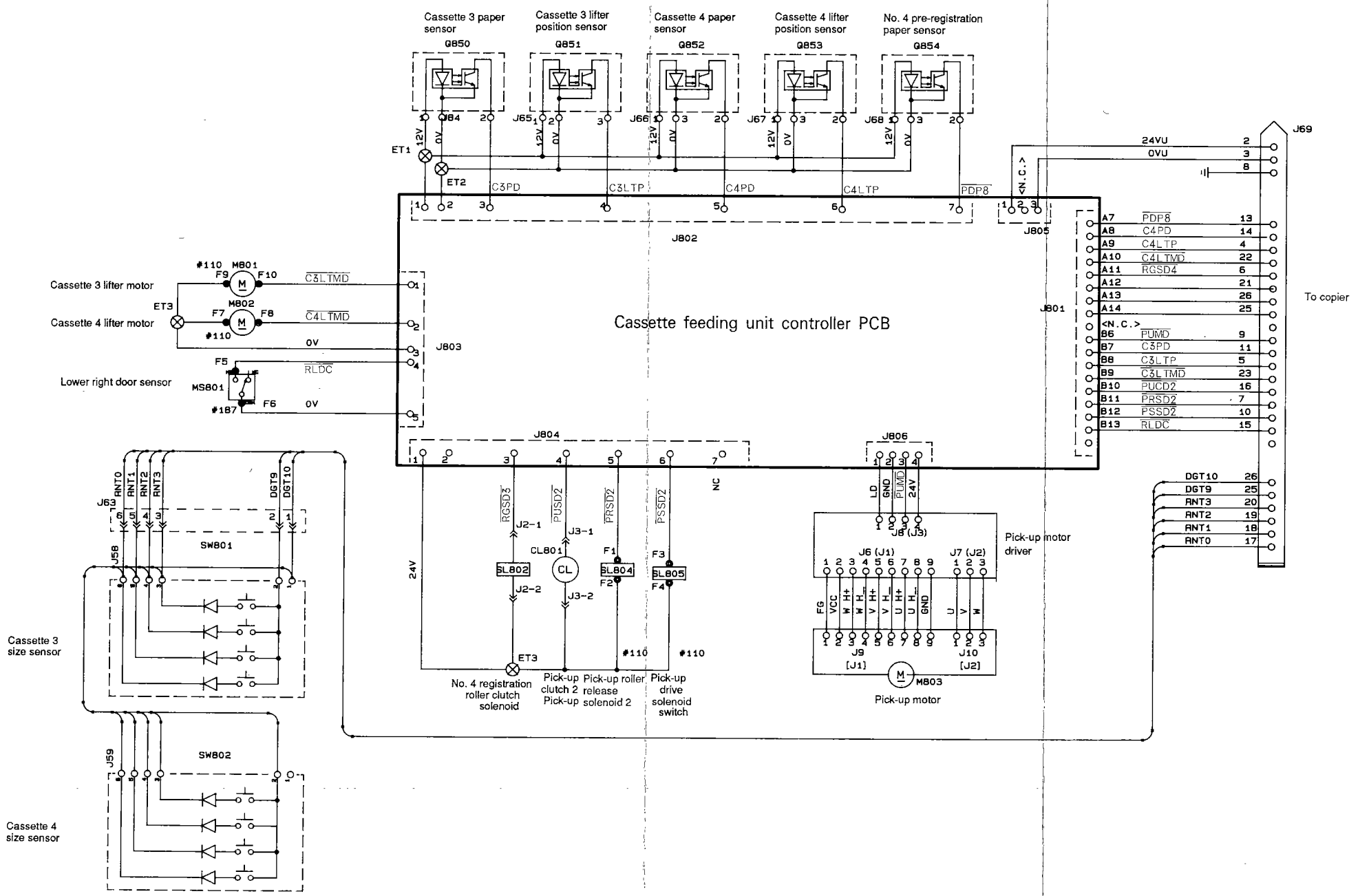

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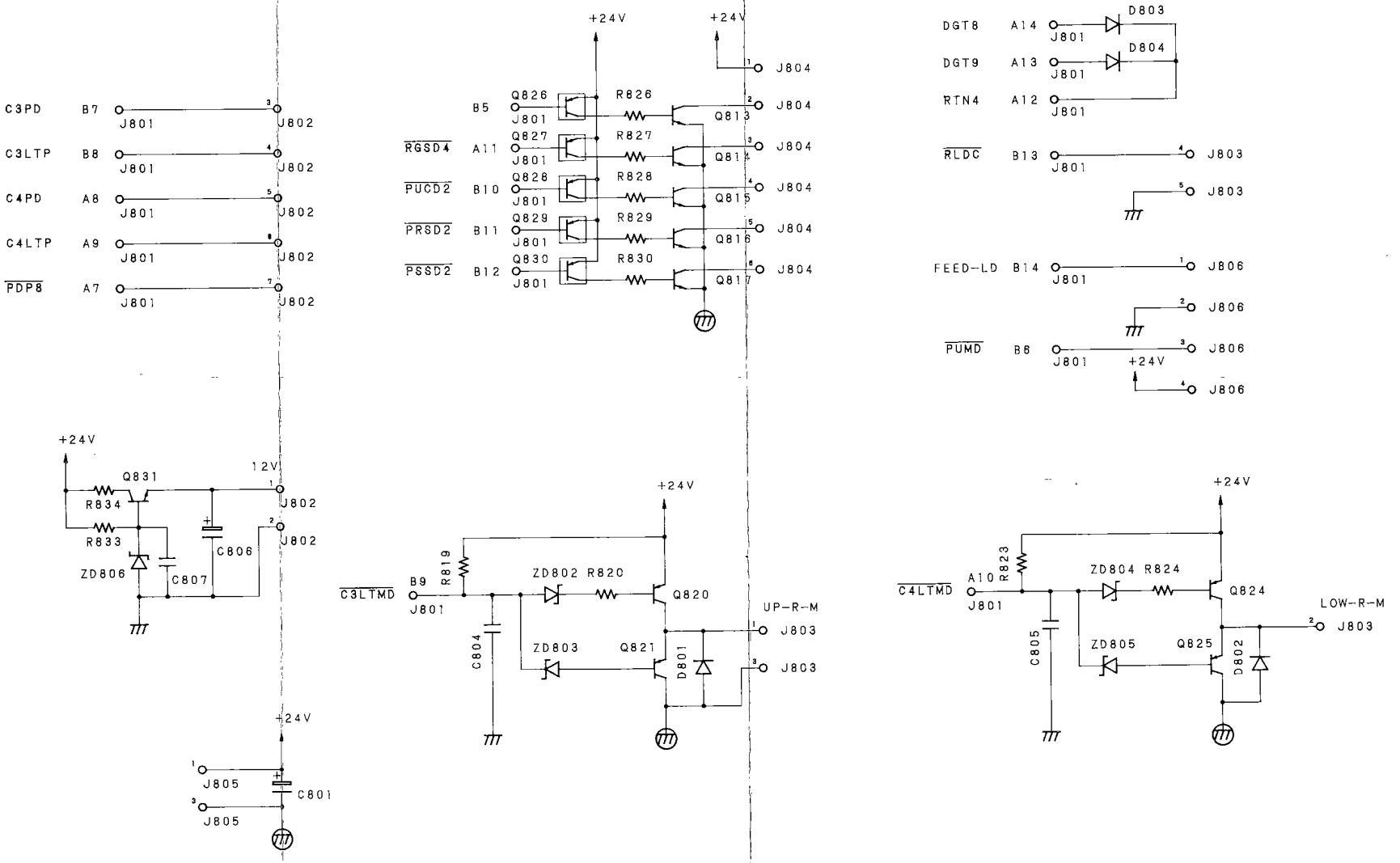
17. CASSETTE FEEDING UNIT CONTROLLER CIRCUIT DIAGRAM



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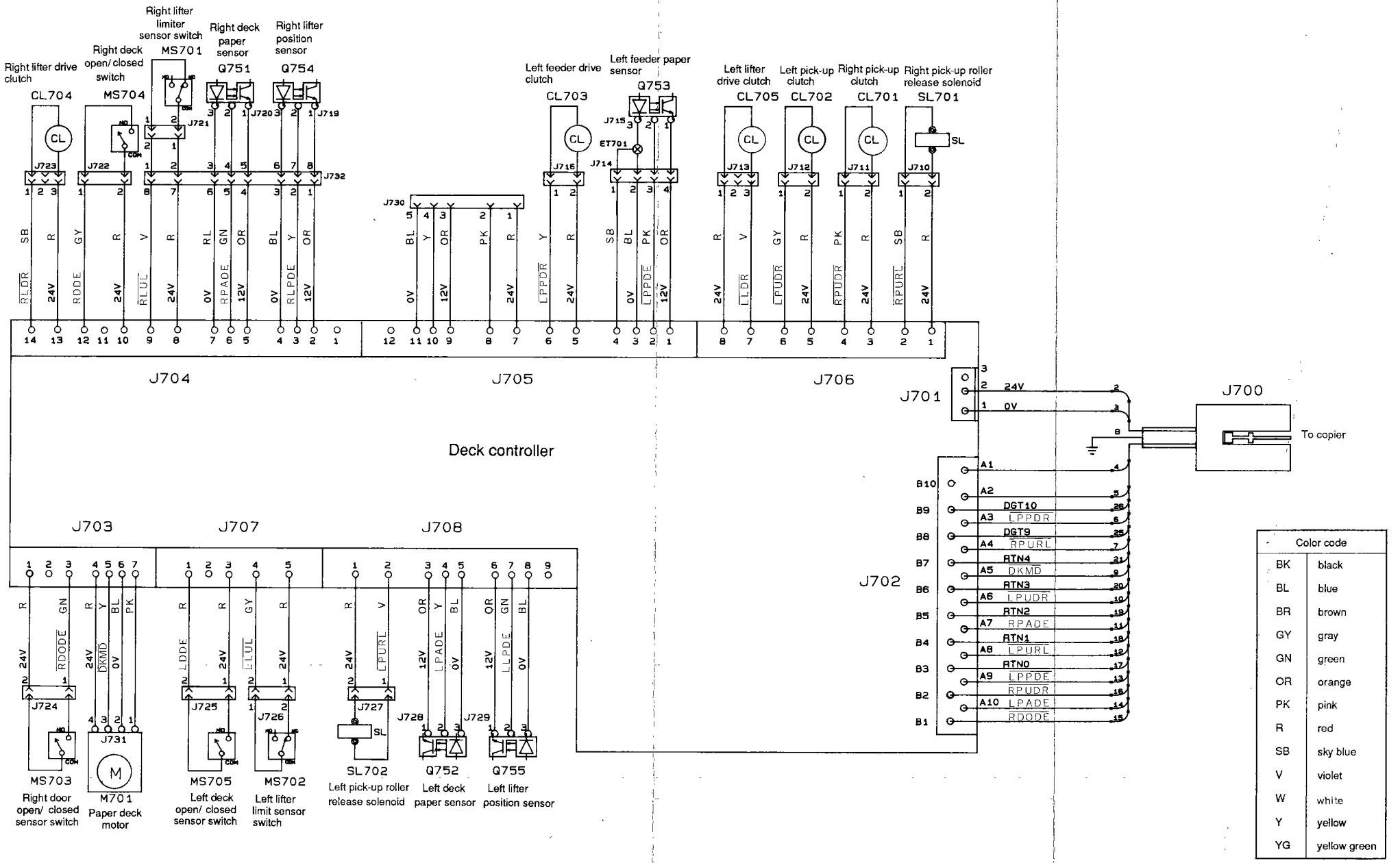

Color code	
BK	black
BL	blue
BR	brown
GY	gray
GN	green
OR	orange
PK	pink
R	red
SB	sky blue
V	violet
W	white
Y	yellow
YG	yellow green

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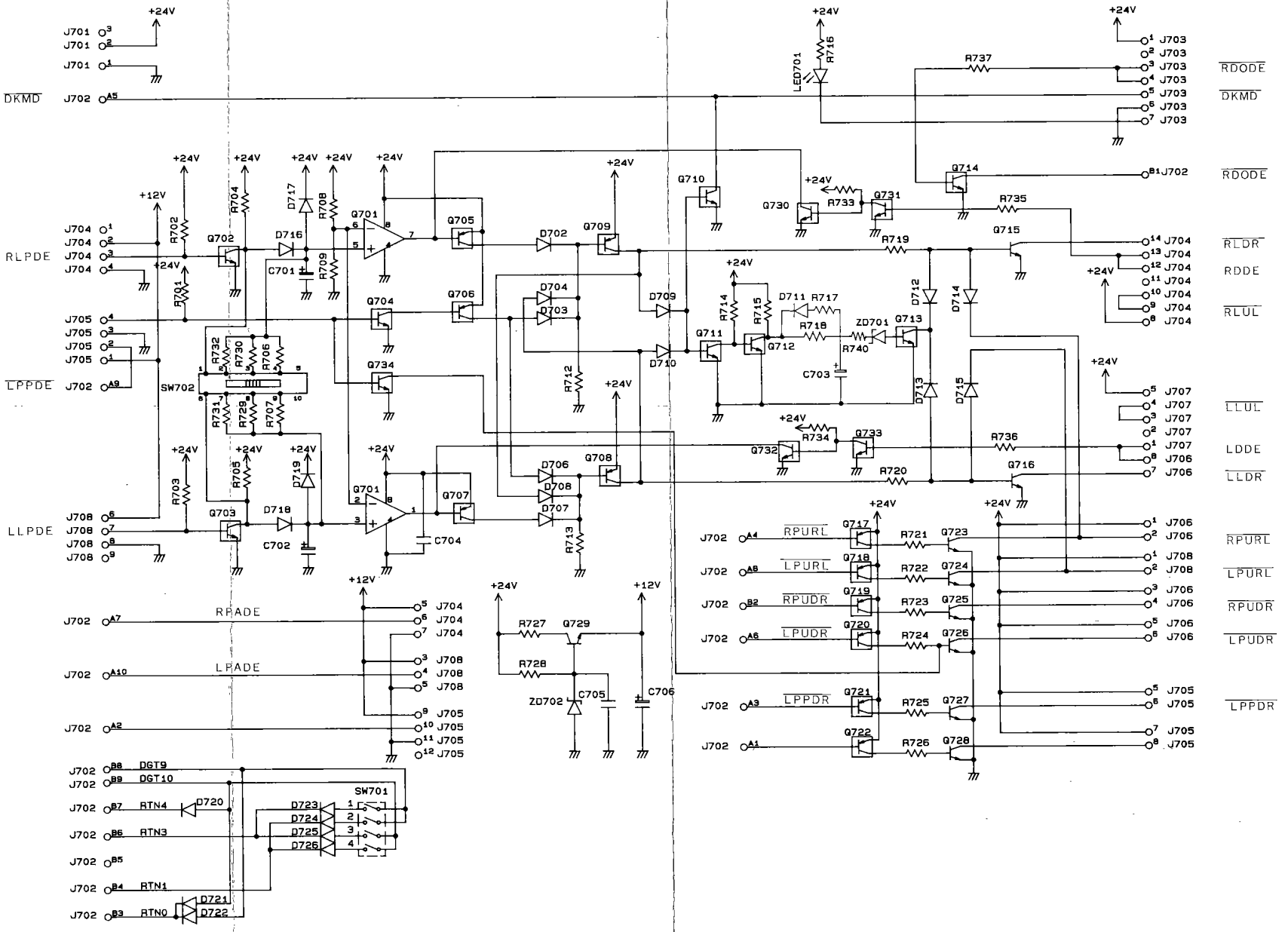
19. DECK CONTROLLER CIRCUIT DIAGRAM



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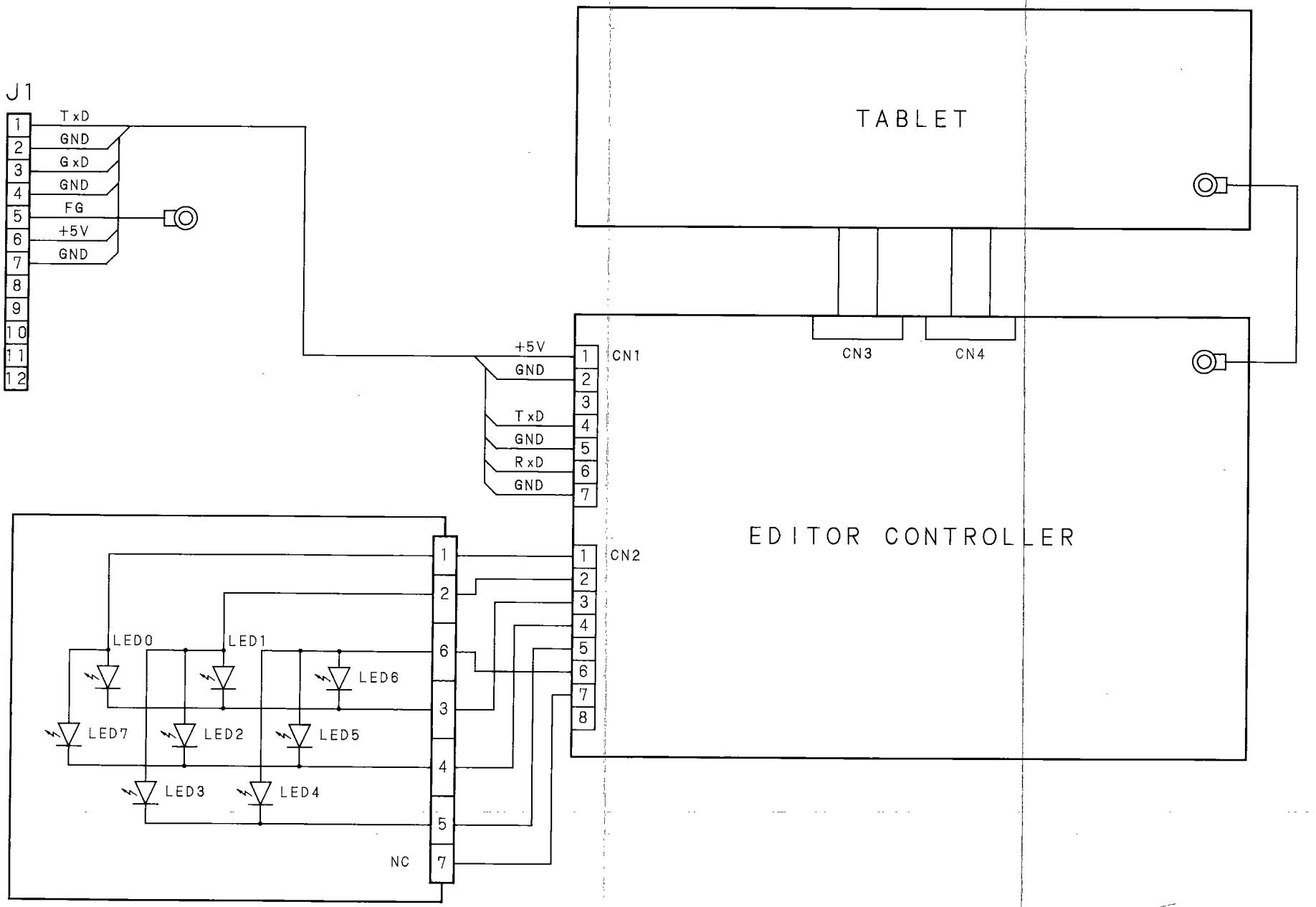

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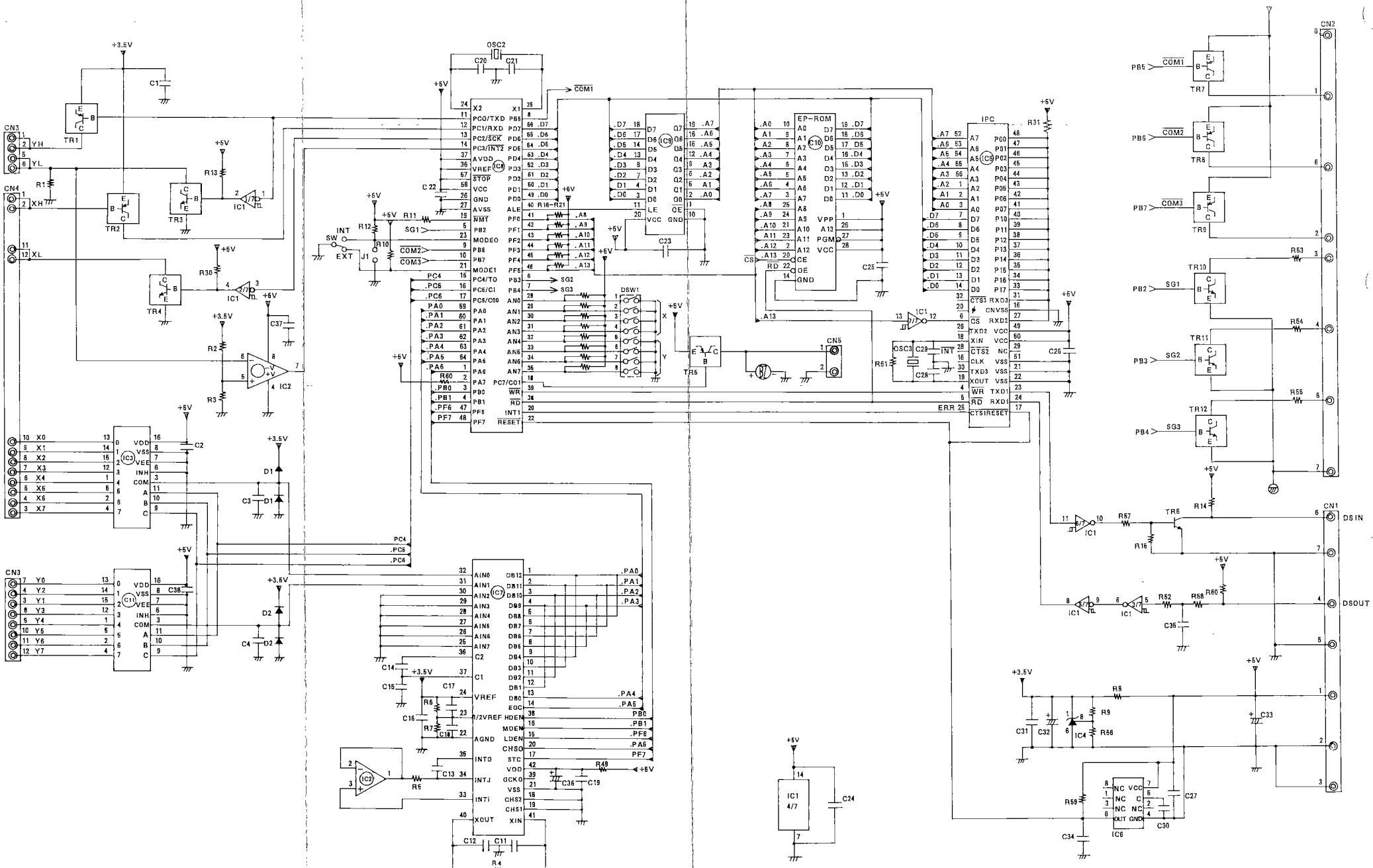
21. NP EDITOR CONTROLLER CIRCUIT DIAGRAM



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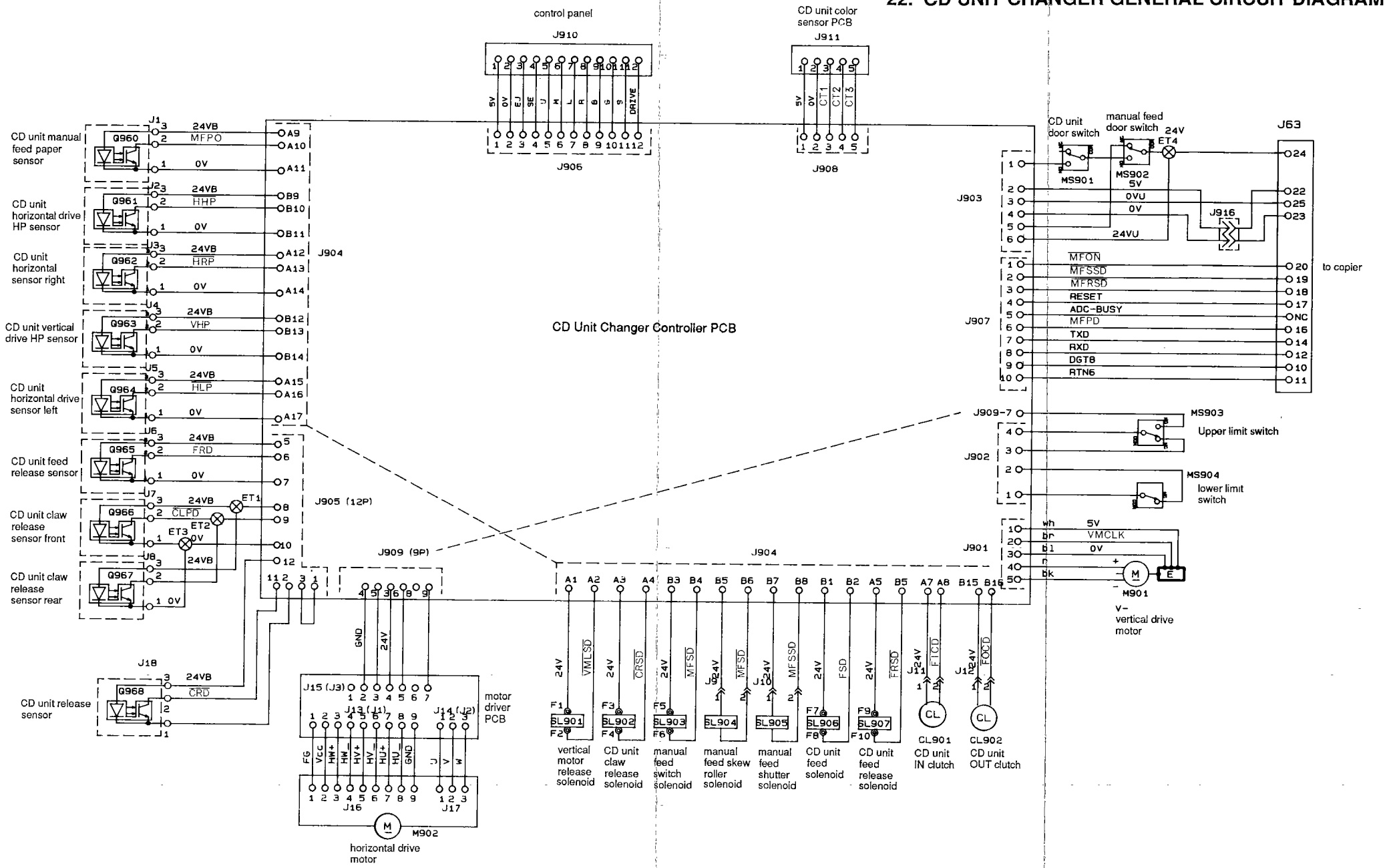
22. CD UNIT CHANGER GENERAL CIRCUIT DIAGRAM



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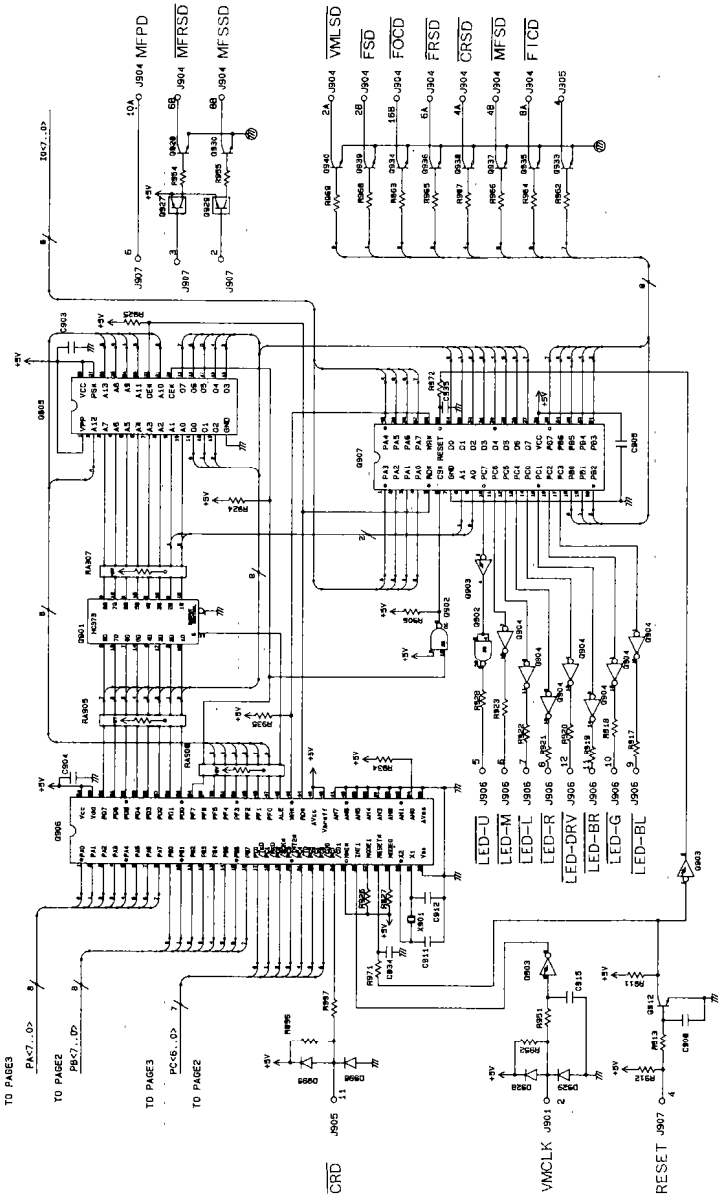
23. CD UNIT CHANGER CONTROLLER CIRCUIT DIAGRAM

CD UNIT CONTROLLER 1/3



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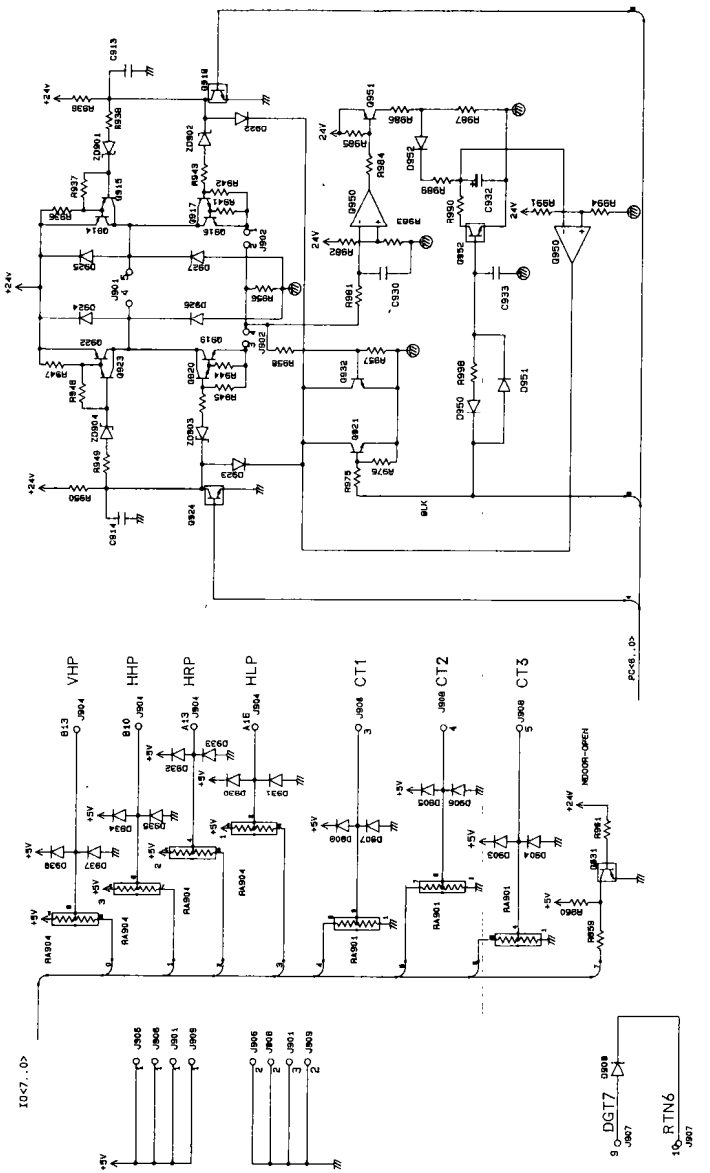
CD UNIT CONTROLLER 2/3



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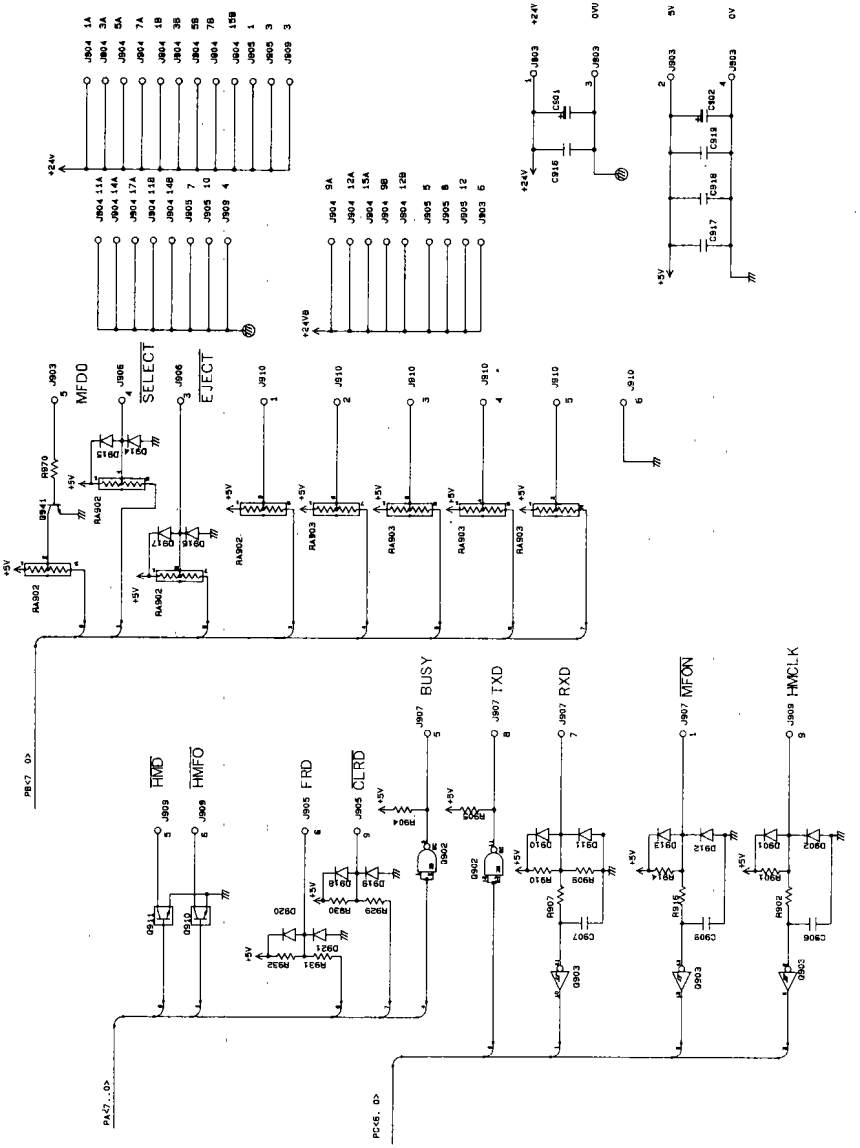
CD UNIT CONTROLLER 3/3



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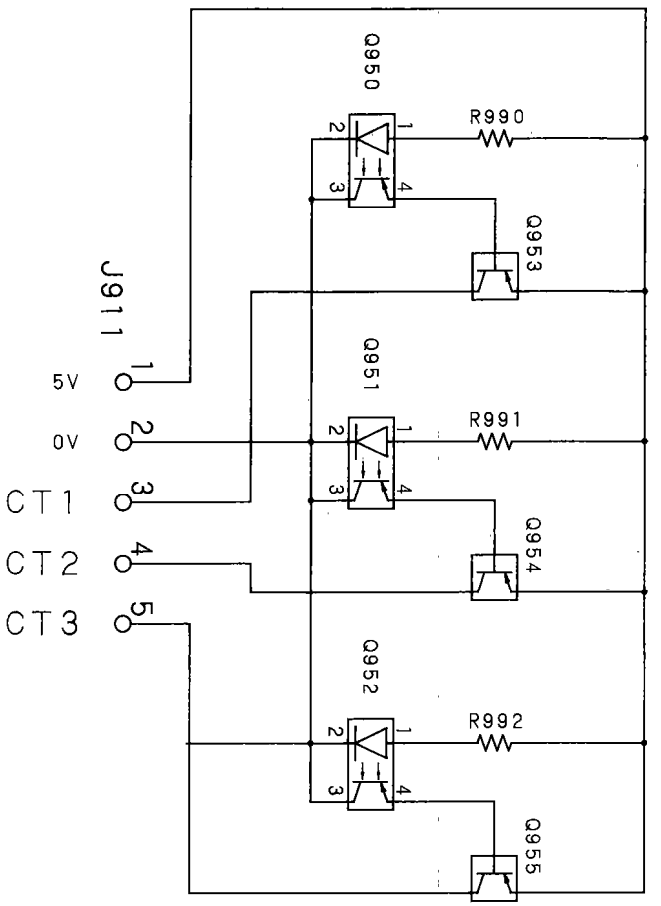
24. CD UNIT COLOR DETECTION CIRCUIT DIAGRAM



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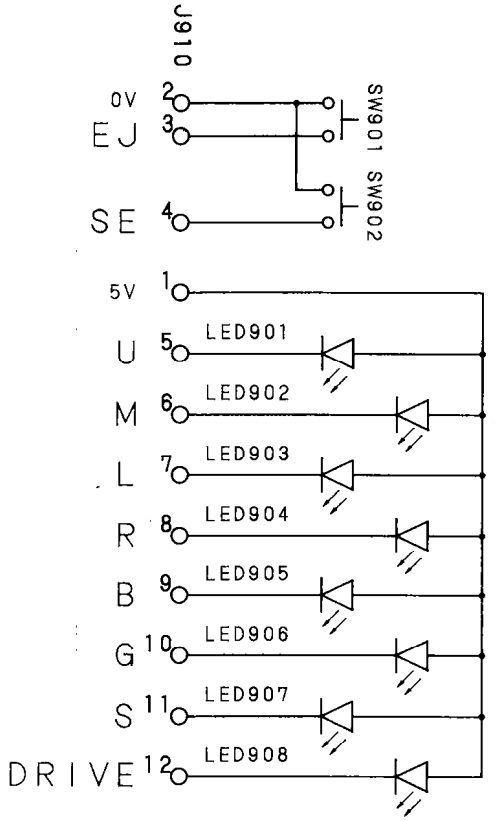
25. CD UNIT CONTROL PANEL CIRCUIT DIAGRAM



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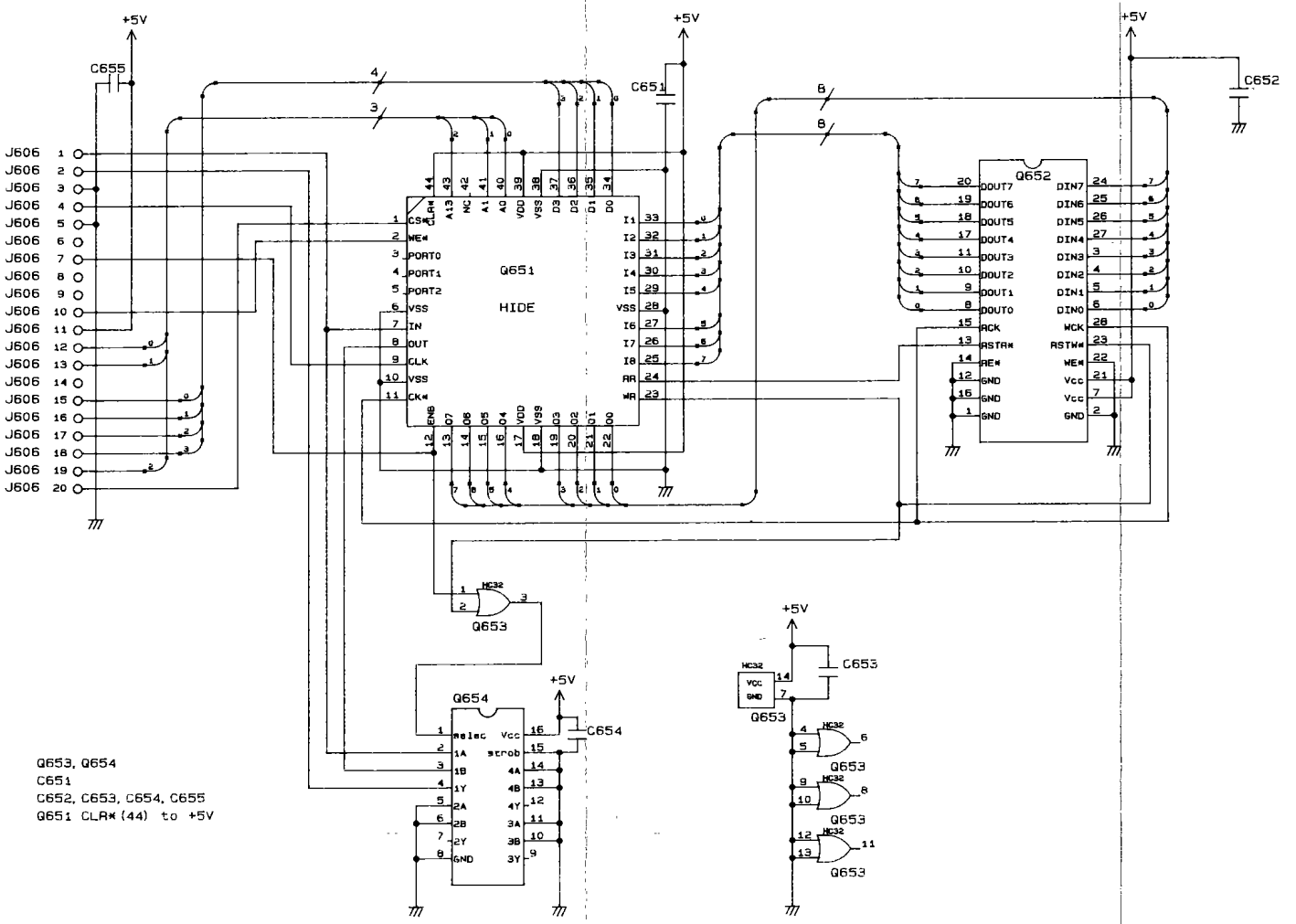
+5V
C655
C651
C652
J606 1
J606 2
J606 3
J606 4
J606 5
J606 6
J606 7
J606 8
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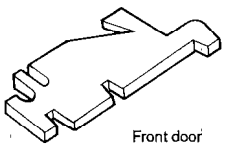
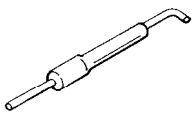
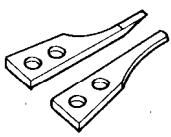
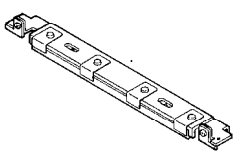
J606 10
J606 11
J606 12
J606 13
J606 14
J606 15
J606 16
J606 17
J606 18
J606 19
J606 20
Q651
HIDE
Q652
Q653
Q654
C653
C654
Q653, Q654
C651
C652, C653, C654, C655
Q651 CLR# (44) to +5V

27. SPECIAL TOOLS

Special tools which are required for servicing this copier (in addition to the standard tools set) are listed below.

No.	Tool name	Tool No.	Shape	Code	Application/remarks
1	Door switch actuator	TKN-0093		A	
2	Spring scale (compression)	CK-0054		B	• Measuring strength of cassette springs • Adjust scanner drive cable tension
3	Extension blades for pliers	CK-0426		B	For removing grip rings: 4 – 9 mm
4	Cleaning oil	TKN-0464		A	Cleaning fixing rollers (10 pcs./1 carton)
5	CD unit polarity orientation tool	TKN-0472		B	

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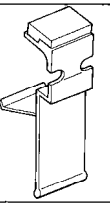
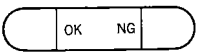
No.	Tool name	Tool No.	Shape	Code	Application/remarks
6	Laser unit cleaning tool	TKN-0471-000		A	
7	Damping material	CK-0437		A	For corona wire (200g/tube)
8	Gap gauge	FY9-3006		B	For adjusting the gap between the developing blade and the developing cylinder.

***Code**

A: Each service technician should carry one with him.
B: A group of five service technicians should share one.
C: Each workshop should keep one.

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28. SOLVENTS/OILS TABLE

No.	Material name	Use	Chemical formula, Mixture ratio, etc.	Source	Remarks
1.	Ethyl alcohol (Ethanol) Isopropyl alcohol (Isopropanol)	Cleaning: copyboard, glass, mirror, etc.	C_2H_5O $(CHZ_3)_2$ CHOH	Locally	Flammable. Use in a well-ventilated area. Avoid breathing concentrated vapor.
2.	MEK	Removing toner or oil stains	$CH_3COC_2H_5$ Methylethyl ketone	Locally	Flammable. Use in a well-ventilated area and avoid breathing concentrated vapor. Avoid contact with eyes or skin. Do not use for cleaning the drum, plastic molded parts, or corona wires.
3.	Heat-resistant grease	Lubricating the drive mechanisms, e.g., copyboard driving gear, fixing drive gear, fixing ass'y, etc.		CANON	Tool No.: CK-0427 (500g can) (Equivalent grease can be used, but should be able to with-stand 200°C for extended periods of time.)
4.	Lubricating oil (low viscosity)	Lubrication points: Scanner rail, etc.	ISO VG 68 oil ESSO Febis K68 MOBIL Vactaoil No. 2 SHELL Tonna oil T68	Locally	Equivalent oil can be used. Tool No.: CK-0451 (100cc)
5.	Lubricating oil (low viscosity)	Lubrication point: One-way clutch in pick-up control unit	ISO VG 220 oil ESSO Febis K220 MOBIL Vactraoil No. 4	Locally	Equivalent oil can be used. Tool No.: CK-0524 (100cc)
6.	Detergent	Cleaning covers and panels of the machine	Mild detergent solution	Locally	Dish-washing detergent is acceptable.

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